13-01-01

Steering

GROUP 13

PART 13-01 *General Steering Service*

COMPONENT INDEX Applies To Models As Indicated	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Maverick	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
LUBRICANT CHECKING PROCEDURE		01-03	01-03	01-03	01-03	01-03	01-03	01-03	01-03	01-03	N/A	N/A	N/A
POWER STEERING GEAR													
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A page number indicates that the item is for the vehicle(s) listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle(s) listed.

CG1707-A

1 TESTING

POWER STEERING—PRELIMINARY TESTS

The following preliminary checks should always be made before performing any operations.

AIR BLEEDING

Air in the power steering system (shown by bubbles in the fluid) should be bled. After making sure that the reservoir is filled to specification (the fluid must be at normal operating temperature when the check is made), turn the steering wheel through its full travel three or four times. **Do not hold the wheels against their stops.** Recheck the fluid level.

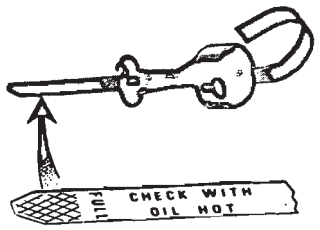

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FIG. 1—Power Steering Pump Dipstick

CHECK FLUID LEVEL

Run the engine until the fluid is at normal operating temperature. Then turn the steering wheel all the way to the left and right several times, and shut off the engine.

Check the fluid level in the power steering reservoir. The level must show on the cross hatching between the bottom of the dipstick and the full mark (Fig. 1). If the level is low, add automatic transmission fluid C1AZ-19582-A. **Do not overfill the reservoir.**

CHECK PUMP BELT

If the pump belt is broken, glazed, or worn, replace it with a new belt. Use only the specified type of belt. Refer to Part 13-07 for belt adjustment procedure.

CHECK FOR FLUID LEAKS

With the engine idling, turn the steering wheel from stop to stop several times. Check all possible leakage points. Tighten all loose fittings, and replace any damaged lines or seats.

CHECK TURNING EFFORT

With the front wheels properly aligned and tire pressures correct, check the effort required to turn the steering wheel.

1. With the vehicle on dry concrete, set the parking brakes.
2. With the engine warmed up and running at idle speed, turn the steering wheel to the left and right several times to warm the fluid.
3. Attach a pull scale to the rim of the steering wheel. Measure the pull required to turn the wheel one complete revolution in each direction. The effort required to rotate the steering wheel should not exceed specifications given at the end of this Part.

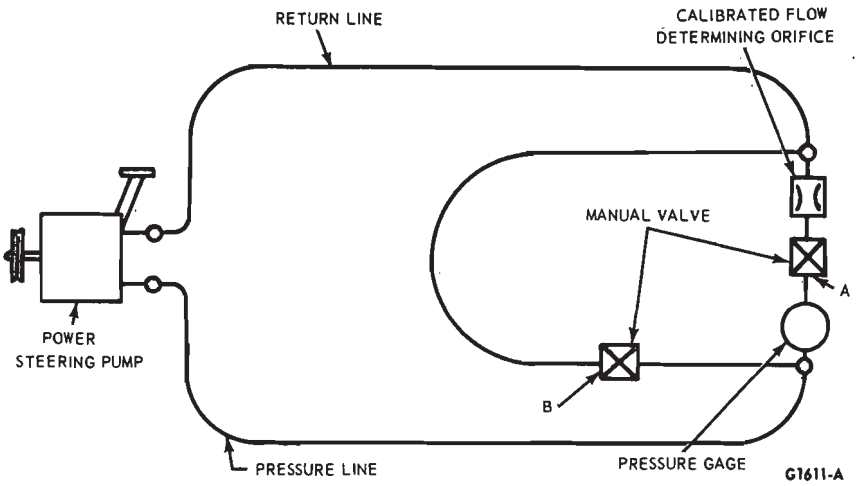

FIG. 2—Power Steering Pump Test Circuit Diagram

POWER STEERING PUMP FLOW AND PRESSURE TESTS

The power steering flow and pressure tests will show whether the pump, steering gear or power assist control valve is causing the trouble. Steps outlined below should be followed to determine the cause of the trouble.

PUMP FLOW TEST

1. Depending on the equipment present on the vehicle (air conditioning, power brakes, standard transmission), **one** of the following options may be used to connect the pump pressure and return hoses to the test tools (T56L-33610-D and T68L-33610-A):

a. Disconnect the pressure and return lines at the power steering pump (Fig. 2). Obtain a power steering return hose from stock and connect the end with the fitting to the output fitting of the tool using the 5/8-18 SAE female, 1/4 N.P. thread male fitting provided. The end of the stock hose (without the fitting) should be connected to the return tube of the pump. Connect the pressure hose from the tool to the outlet fitting of the pump.

b. Disconnect the pressure line at the pump and connect the pressure line from the test tool to the outlet fitting of the pump. Disconnect the return line **at the gear** and connect it to the output fitting of the tool, using the 5/8-18 SAE female, 1/4 N.P. thread male fitting provided.

2. After installing the lines by the most advantageous method, proceed as follows:
3. Open the manual valves A and B fully (Fig. 2).
4. Connect a tachometer, start the engine and operate it at idle speed **until the reservoir fluid temperature reaches 165 to 175. This temperature must be maintained throughout the test.** Valve B may be partially closed to create a back pressure up to 350 psi to hasten the temperature rise. The reservoir fluid must be at the proper level.
5. With the engine operating at recommended idle rpm and fluid temperature noted in Step 4, close the manual valve B. The minimum acceptable pressure readingis 620 psi for all vehicles **except Lincoln Continental, Thunderbird and Continental Mark III.** The minimum acceptable pressure for these latter three vehicles is 900 psi.
6. If the pressure gauge reading is **below** the minimum specification, the pump is at fault and should be repaired with necessary parts.
7. If the reading is **at or above** the minimum specification, the pump flow is normal. Open manual valve B and proceed to the Pump Fluid Pressure Test.

PUMP FLUID PRESSURE TEST

1. Keep the lines and tools connected as in the Pump Flow Test.
2. With manual valves A and B opened fully, operate the engine at recommended idle speed (Fig. 2). Close manual valve A, then manual valve B. **Do not keep both valves closed for more than 5 seconds as this would abnormally increase the fluid temperature and cause undue pump and/or gear wear.**
3. With the valves fully closed, the pressure gauge should read 1000 psi

minimum for all vehicles **except Lincoln Continental, Continental Mark III and Thunderbird.** These latter three vehicles require a 1200 psi minimum pressure.

4. If the pressure gauge reading is **below** the minimum specification, the pump is at fault and should be repaired with necessary parts.

5. If the pressure gauge reading is **at or above** the minimum specifications, the pump is normal and the power steering gear or power assist control valve is at fault.

LUBRICANT CHECKING PROCEDURE

MANUAL STEERING GEAR

1. Center the steering wheel.
2. Remove the steering gear housing filler plug.
3. Remove the **lower (upper** on Mustang and Cougar) cover-to-housing attaching bolt.
4. With a clean punch or like instrument, clean out or push inward the loose lubricant in the filler plug hole and cover to housing attaching bolt hole.
5. Slowly turn the steering wheel to the left stop, lubricant should rise within the lower cover bolt hole; then slowly turn the steering wheel to the right stop, lubricant should rise within the filler plug hole. If lubricant does not rise in both the cover bolt hole and the filler plug hole, add lubricant until it comes out both holes during this check.
6. Install the **lower (upper** on Mustang and Cougar) cover-to-housing attaching bolt and the filler plug.

2 CLEANING AND INSPECTION

POWER STEERING GEAR

CLEANING

Disassembly and assembly of the steering gear and the sub-assemblies must be made on a clean workbench. As in repairing any hydraulically operated unit, cleanliness is of utmost importance. The bench, tools, and parts must be kept clean at all times. Thoroughly clean the exterior of the unit with a suitable solvent and, when necessary, drain as much of the hydraulic fluid as possible. Handle all parts very carefully to avoid nicks, burrs, scratches and dirt, which could make the parts unfit for use.

Do not clean, wash or soak seals in cleaning solvent.

INSPECTION

1. Check the sector shaft contact surface in the cover for wear. If worn, replace the cover.
2. Inspect the input shaft bearing for cracked races and the balls for looseness, wear, pitting, end play or other damage. Check the fit of the bearing on the input shaft. Replace the bearing, if required.
3. Inspect the valve housing for wear, scoring or burrs.
4. Inspect the tube seats in the pressure and return ports in the valve body for nicks, etc. If necessary, remove and replace.
5. Check the sector shaft contact surface in the housing for wear. If worn, replace the housing.
6. Check all fluid passages for obstruction or leakage.
7. Inspect the steering gear housing for cracks, stripped threads, and mating surfaces for burrs. Inspect the piston bore of the housing for scoring or wear. If necessary, replace the housing.
8. Check the input shaft bearing after installation to be sure that it rotates freely.
9. If the valve spool is not free in the valve housing, check for burrs at the outward edges of the working lands in the housing and remove with a hard stone. Check the valve spool for burrs and if burrs are found, stone the valve in a **radial direction only.** Check for freedom of the valve again.
10. Check the piston rack teeth and sector shaft teeth for nicks and burrs.

FLUSHING THE POWER STEERING SYSTEM

Should it be necessary to replace an inoperative power steering pump when fluid contamination could have occurred, the need for flushing the steering system is required when installing the new pump.

1. Remove the power steering pump and remove the pulley as outlined in Part 13-07.
2. Install the pulley on a new pump. Install the pump and connect only the pressure hose to the pump (Part 13-07).
3. Place the fluid return line in a suitable container and plug the reservoir return pipe.
4. Fill the reservoir with lubricant (C1AZ-19582-A).
5. Disconnect the coil wire to prevent the engine from starting and raise the front wheels off the ground.
6. While approximately two quarts of steering gear fluid are being poured into the reservoir, turn the engine over using the ignition key, at the same time cycle the steering wheel from stop to stop.
7. As soon as all of the lubricant has been poured in, turn off the ignition key, and attach the coil wire.
8. Remove the plug from the reservoir return pipe, and attach the return hose to the reservoir.
9. Check the reservoir fluid level; if low, add fluid to the proper level. **Do not overfill.**
10. Lower the vehicle.
11. Start the engine and cycle the steering from stop to stop to expel any trapped air from the system.

POWER STEERING PUMP

CLEANING

Wash all parts (except seals) in a Naptha or Chlorinated-type solvent and dry with compressed air.

The following procedure should be followed when cleaning the relief valve which is a part of the pump valve assembly.

1. Using a punch or rod of suitable diameter, apply an even pressure in a straight line to the tip of the relief valve pin (Fig. 3). Depress the valve two or three times to exhaust the oil which is trapped in the assembly. Do not hammer on the valve pin or housing.
2. Submerge the assembly in a container of **clean** solvent. Again applying an even pressure to the tip of the relief valve pin, (a sudden strong force could push the pin

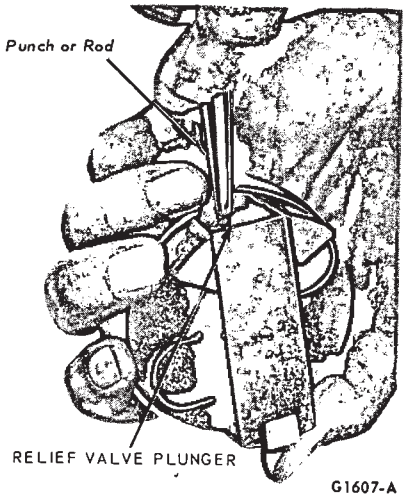

FIG. 3—Cleaning Pump Relief Valve

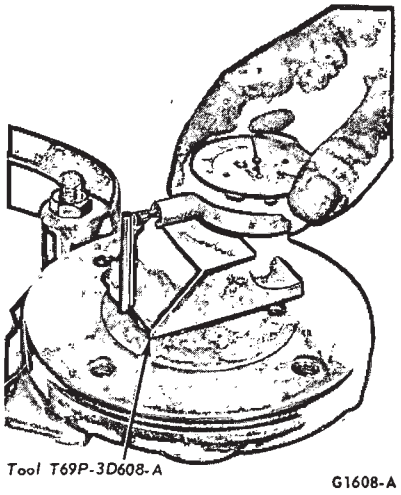

FIG. 4—Dowel Pin Squareness Check

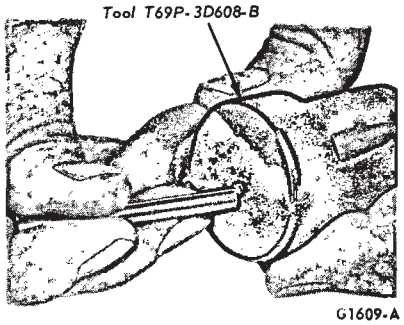

FIG. 5—Dowel Pin Insertion

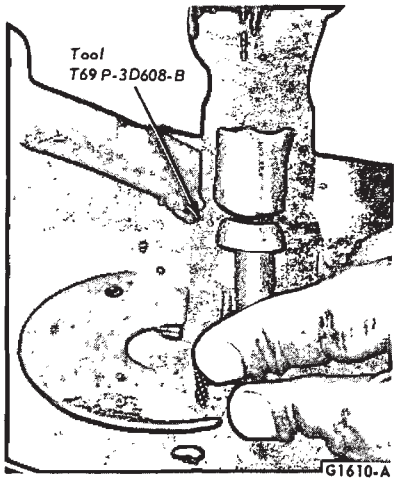

FIG. 6—Replacing Dowel Pin

through the relief valve spool) move the valve in and out several times, thereby thoroughly flushing the assembly. Pressure created within the valve bore when the valve is moved inward should force the cleaning fluid out through the sensing orifice. If this does not occur, the sensing orifice should be cleaned with a piece of wire. The valve must move freely and evenly. If the pin is bent or damaged, or if the valve binds, the pump valve must be replaced.

INSPECTION

The following describes the components of the power steering pump which must be replaced **regardless of condition** and how to determine when other components should be replaced.

The outlet fitting hex nut may be reused if the corners of the hex are not rounded. The housing bolts may be reused if the threads are not damaged.

All gaskets and seals must be replaced with new components except the rotor shaft seal which should be reused unless it was leaking.

The reservoir assembly may be reused if the reservoir seal and gasket areas are not damaged (dents, scratches, etc.). The soldered joints of the return and fill tubes must not be loose or bent. Be sure to check for a broken baffle.

The housing or housing assembly may be reused if there is no damage (scratches, etc.) at reservoir gasket, outlet fitting or cover seal areas.

If the outlet fitting is damaged, the pump housing must be replaced. On 7/8 in. OD fittings, replace the tube seat if it is damaged. On 5/8 in. OD flared fittings, a tube seat can be installed between the outlet fitting and the hose connector to improve sealing. The pressure plate springs may be reused providing they are not bent, broken or have not taken a set.

Do not reuse the retainer end plate (if so equipped) if it is burred or damaged. The upper pressure plate may be reused if there is no scoring on the wear surface. It is acceptable to polish the phosphate coating.

The rotor and cam assembly can be reused if there is no wear other than the removal of the phosphate coating on the cam contour. Do not disassemble the rotor and cam assembly. Push the rotor part way out the cam insert taking care not to let the slippers and springs fall out. Check the cam ID for scoring and burning. Check the rotor faces and OD for scoring and chipping. Do not attempt to repair or refinish the lower and upper pressure plates, cam or rotor assembly. When wear or burning is encountered. replace them with new components.

Install a new rotor and cam assembly if the slippers are worn. Replace the springs if they are bent or broken. Polishing the phosphate coating of the slipper sealing surface is permissable.

The rotor shaft can be reused if the front and rear thrust faces, the bushing diameter and the shaft seal diameter are not excessively worn or scored.

The housing plate and bushing assembly may be reused if all of the threaded holes are not damaged beyond repair and the bushing diameter is not scored or worn .0005 inch over the maximum dimension of .6897 inch. Threaded holes can be repaired by drilling out the damaged threads and installing a helicoil insert. If the bushing is scored or excessively worn, a new plate and bushing assembly must be installed.

With Tool T69P-3D608-A (using a dial indicator) check the squareness of the fixed dowel pin in the plate (Fig. 4). The pin must be square with the adjacent surface within .001 inch per inch through a 180 degree arc.

A bent or broken dowel pin can be replaced as follows:

1. Hold the plate assembly in a horizontal position and grip at least an inch of the dowel pin in a vise. Tap the plate with a plastic or a rubber hammer to pull the pin from the plate.
2. Insert the support guide (Tool T69P-3D608-B) over a dowel pin (Fig. 5) and press the pin into the plate to a height of 1.68 inch (See Fig. 6). The support guide tool will serve as a stop guide. Be careful not to bend the new dowel pin during installation.
3. Again use Tool T69P-3D608-A (with a dial indicator) to check the dowel pin squareness as outlined above.

3 SPECIFICATIONS

STEERING WHEEL TURNING EFFORT (LBS)

Vehicle	Power	Manual
Ford, Mercury, Meteor	5.0	38.0
Thunderbird, Lincoln Continental Mark III	4.0	
Mustang, Cougar	6.5	6 Cyl. 31.5 302, 351 CID 37.0 390, 428 CID 42.0
Fairlane, Montego Falcon	6.5	6 Cyl. 30.0 302 CID 35.0 351, 429 CID 37.0
Maverick	6.5	6 Cyl. 28.0 302 CID 33.0

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SPECIAL SERVICE TOOLS

Tool No.	Description
T56L-33610-D	Pressure Testing Gauge Assembly
T68L-33610-A	Bypass and Orifice Gauge
T69P-3D608-A	Pin Straightness Checking Block
T69P-3D608-B	Pin Guide Support

CG1715-A

PART 13-02 *Steering Columns*

COMPONENT INDEX Applies To Models As Indicated	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Maverick	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
ACTUATOR, STEERING WHEEL LOCK PIN AND FLANGE CASTING (TILT COLUMN) Removal and Installation		02-15	02-15	02-15	02-15	N/A	N/A	N/A	N/A	02-15	02-15	02-15	02-15
DRIVE GEAR Removal and Installation		02-13	02-13	02-13	02-13	02-13	N/A	N/A	02-13	02-13	02-13	02-13	02-13
FLANGE CASTING AND/OR SOCKET CASTING (FIXED COLUMN) Removal and Installation		02-14	02-14	02-14	02-14	02-14	N/A	N/A	02-14	02-14	02-14	02-14	02-14
LOCK CYLINDER ASSEMBLY Removal and Installation		02-13	02-13	02-13	02-13	02-13	N/A	N/A	02-13	02-13	02-13	02-13	02-13
STEERING COLUMNS Description	02-01												
Removal and Installation		02-07	02-07	02-07	02-03	02-06	02-05	02-04	02-06	02-03	02-10	02-09	02-09
STEERING COLUMN SHIFT TUBE Removal and Installation	02-16												
STEERING COLUMN UPPER BEARING Removal and Installation	02-02												
STEERING WHEEL Removal and Installation	02-02												
Spoke Position Adjustment	02-02												
TILT COLUMN MECHANISM Removal and Installation		02-11	02-11	02-11	02-11	N/A	N/A	N/A	N/A	02-11	02-11	02-11	02-11

A page number indicates that the item is for the vehicle(s) listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle(s) listed.

1 DESCRIPTION

STEERING COLUMNS—FIXED OR TILT

The steering columns are of the collapsible type to lessen the possibility of injury to the driver of the vehicle should he become involved in an accident. The lower end of the steering column tube at the bellows area will collapse approximately six inches upon a hard impact.

The shift tube and the steering shaft are provided with plastic dowels and will shear and allow them to collapse in proportion to the outer tube upon impact.

Once the steering column has been collapsed, a complete new column must be installed with new brackets which also will shear away during impact.

The tilt column features five driving positions (two up and two down from a center position). The column has a turn signal switch with a lane-changer position turn indicating position and emergency warning flasher control.

Both fixed and tilt columns (except early Falcon and Maverick vehicles) are equipped with an anti-theft locking device incorporated in a column-mounted ignition switch. This provides a positive lock on the transmission linkage as well as the steering system.

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

STEERING WHEEL SPOKE POSITION ADJUSTMENT

When the steering gear is on the high point, the front wheels should be in the straight-ahead position and the steering wheel spokes should be in their normal position with the Pitman arm pointing directly forward. If the spokes are not in their normal position, they can be adjusted without disturbing the toe-in adjustment (Part 14-01). This adjustment may be made only when the steering gear is on the high point and the spokes are not in the normal position.

STEERING WHEEL REMOVAL AND INSTALLATION

1. Disconnect the negative cable from the battery.
2. Working from the underside of the steering wheel spoke, remove the crash pad attaching screws. Lift the crash pad from the wheel. (On models equipped with steering wheel mounted speed controls, refer to Group 37 for removal instructions). Remove the horn ring (if so equipped) by turning it counterclockwise.
3. Remove the steering wheel nut and remove the steering wheel with tool T67L-3600-A (Fig. 1). **Do not use a knock-off type steering wheel puller or strike the end of the steering shaft with a hammer. Striking the puller or shaft will damage the bearing or the collapsible column.**
4. Transfer all serviceable parts to the new steering wheel.
5. Position the steering wheel on the shaft so the alignment mark on the hub of the wheel is adjacent to the one on the shaft. Install a new locknut and torque it to specifications.
6. Install the horn ring (if so equipped) and crash pad.

STEERING COLUMN UPPER BEARING REMOVAL AND INSTALLATION

FIXED COLUMNS

Removal

1. Disconnect the horn wire and the turn indicator wires at the connector.
2. Working from the underside of the steering wheel spoke, remove the two crash pad attaching screws. Lift the crash pad from the wheel. (On models equipped with steering wheel mounted speed controls, refer to Group 37 for removal instructions). Remove the horn ring (if so equipped) by turning it counterclockwise.
3. Remove the steering wheel attaching nut. Remove the steering wheel using tool T67L-3600-A (Fig. 1). **Do not use a knock-off type steering wheel puller or strike the end of the steering shaft with a hammer. Striking the puller or shaft will damage the bearing or the collapsible column.**
4. Remove the turn indicator lever.
5. Remove the turn signal switch attaching screws. Lift the switch over the end of the steering shaft and place it to one side.
6. Remove the snap ring from the top of the steering shaft.
7. Loosen the two flange-to-steering column tube retaining nuts to disengage them from the tube.
8. Raise the flange upward while tapping the steering shaft lightly with a plastic hammer to free the bearing and flange from the shaft.
9. Remove the bearing and insulator from the flange.

Installation

1. Position the flange onto the steering column tube.
2. Engage the two retaining nuts on the T-bolts; then, tighten to specification.
3. Position the bearing and insulator on the shaft. Work it down onto the shaft as far as possible, then place a piece of 3/4 ID x 2 1/8 inch pipe over the end of the shaft and install the steering wheel attaching nut (Fig. 2). Install the bearing upper retaining ring on the shaft using the pipe and nut to seat.
4. Tighten the nut until the bearing is seated in the flange, then remove the nut and pipe from the shaft.
5. Position the turn signal switch on the flange and install the three attaching screws.
6. Make certain that the wheels are in the straight ahead position. Place the steering wheel on the steering shaft with the spokes in the horizontal position. Install and torque the attaching nut to specification.
7. Secure the crash pad to the steering wheel with the two attaching screws.
8. Connect the horn and turn signal wires.
9. Install the turn signal lever.

TILT COLUMNS

Removal

1. Remove the tilt column mechanism as detailed in the Removal and Installation section of this Part.
2. Place the flange casting on a bench with the smaller bearing facing down. Drive lightly on the outer race at each slot with a small pick.
3. Remove the larger, upper bearing in the same manner after inverting the flange. **Never drive or apply pressure to the inner race.**

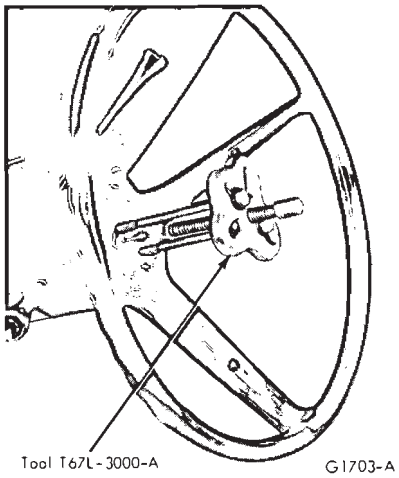

FIG. 1—Removing Steering Wheel

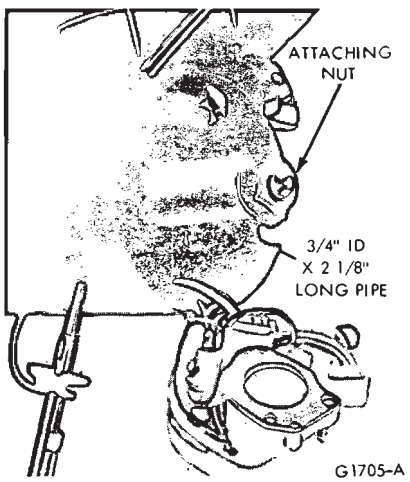

FIG. 2—Installing Upper Bearing—Fixed Columns

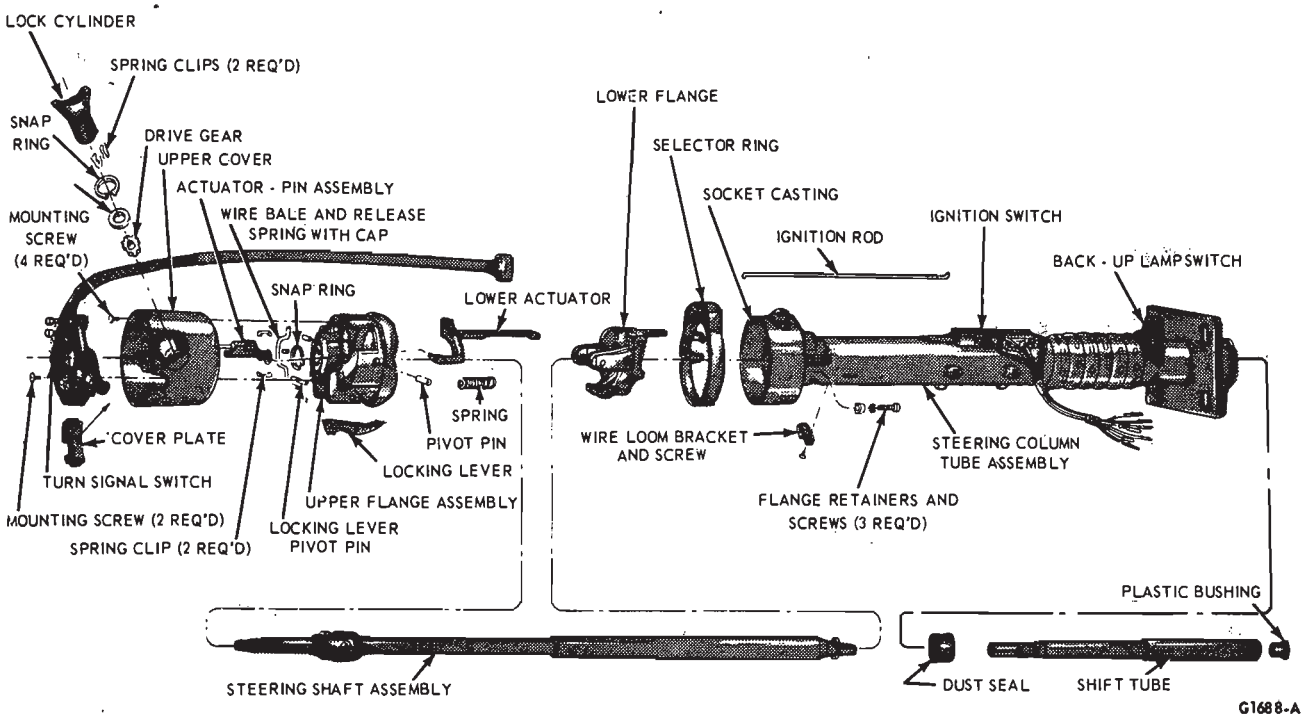

FIG. 3—Typical Steering Column—Disassembled

Installation

1. Select a socket wrench that is the same diameter of each bearing outer race. Position the bearings on the flange with the open side facing inward. Place the socket on the outer races and tap the bearings into place. **Be careful not to contact the bearing inner race as damage will result.**
2. Install the tilt column mechanism as detailed in the Removal and Installation section of this Part.

3 REMOVAL AND INSTALLATION

STEERING COLUMN

COUGAR, MUSTANG

Removal

1. Disconnect the negative battery cable.
2. Disconnect the transmission control rods and the two nuts retaining the flex coupling to the steering shaft. On a tilt column, remove only one bolt retaining the flex coupling to the shaft.
3. Remove the four screws in the toe plate.
4. Disconnect the electrical quick couplers for the column electrical leads.
5. Remove the three screws from the upper column attaching bracket A (Fig. 4). Drop the column from the instrument panel and remove it from the vehicle.

Installation

1. Place the column in the vehicle and insert the steering shaft through the hole in the dash panel. Insert the steering shaft into the flex coupling. Raise the upper column over the rearmost studs on bracket C. Loosely attach the two retaining nuts. Center the column shift tube to the steering shaft.

Tilt Column. Insert a .15-inch diameter rod between the fabric and the flange. Torque the one bolt coupling to the shaft (20-37 ft-lb).

Fixed Column. Insert a 1/4-inch diameter rod between the fabric and the flange. Torque the two nuts between the coupling to the shaft (10-22 ft-lb).

2. Loosen the two bolts holding bracket B to bracket C.
3. Align the upper column and torque the two retaining nuts 13-27 ft-lb.
4. Align the toe plate to the holes in the dash panel and secure the 4 screws in the following order:
   a. Torque the lower outboard screw to 5-15 ft-lb.
   b. Torque the upper inboard screw to 5-15 ft-lb.
   c. Torque the remaining two screws to 5-15 ft-lb.
5. Install the one remaining nut holding bracket A to bracket B and torque to 13-27 ft-lb.
6. Torque the two bracket B nuts to bracket C 13-27 ft-lb.

7. Remove the 1/4-inch diameter rod from the flex coupling.
8. Attach the transmission control rods, lock rod, and negative battery cable.
9. Adjust the transmission shift linkage.

MAVERICK

Removal

1. Disconnect the battery cable from the negative post.
2. Disconnect the transmission shift linkage at the lower end of the column.
3. Disconnect the two bolts that secure the flex coupling to the steering gear.
4. Remove the two screws attaching the ignition switch to the package shelf.
5. Remove the one screw at the center and the two bolts (each side) attaching the package shelf to the dash. Remove the package shelf.
6. Remove the steering wheel from the steering shaft with tool T67L-3600-A. Then, remove the tool from the steering wheel. **Do not use a knock-off type steering wheel puller or strike the end of the steering shaft with a hammer. Striking the puller or shaft will damage the bearing or the collapsible column.**
7. Disconnect the turn signal wires and the neutral switch (if so equipped).
8. Remove the four bolts attaching the toe plate to the dash (Fig. 5).
9. Remove the two nuts retaining the column retaining clamp to the toe plate.
10. Remove the one bolt attaching the retaining clamp to the column.
11. Remove the two nuts retaining the shroud and the three nuts retaining the column upper bracket to the brake pedal support bracket.
12. Remove the column from the vehicle.
13. Remaining bracketry may be removed from column or vehicle as required.

Installation

1. Position the column in the vehicle making sure the column engages the flex coupling splines with no interference.

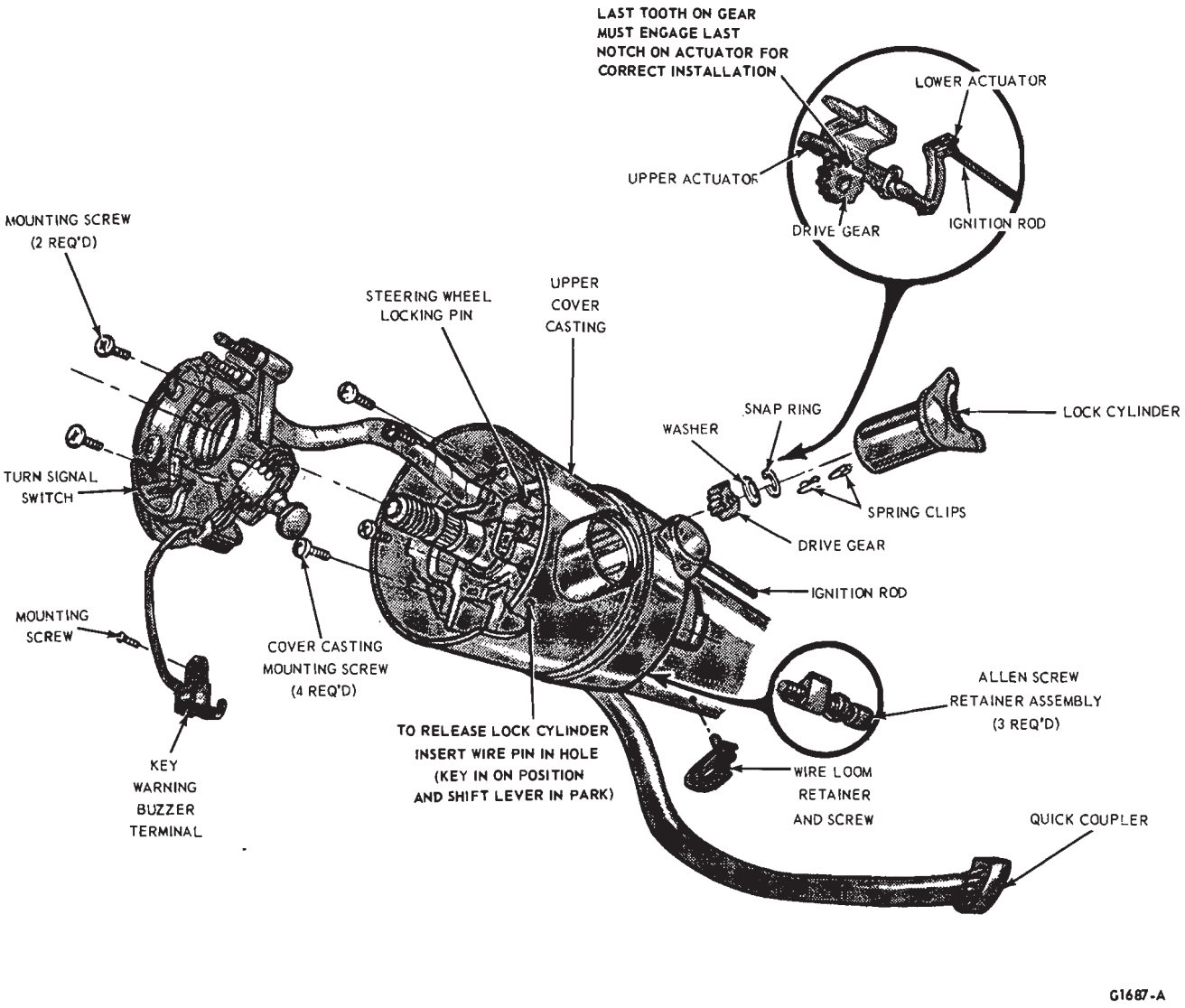

FIG. 4—Steering Column Installation—Mustang, Cougar

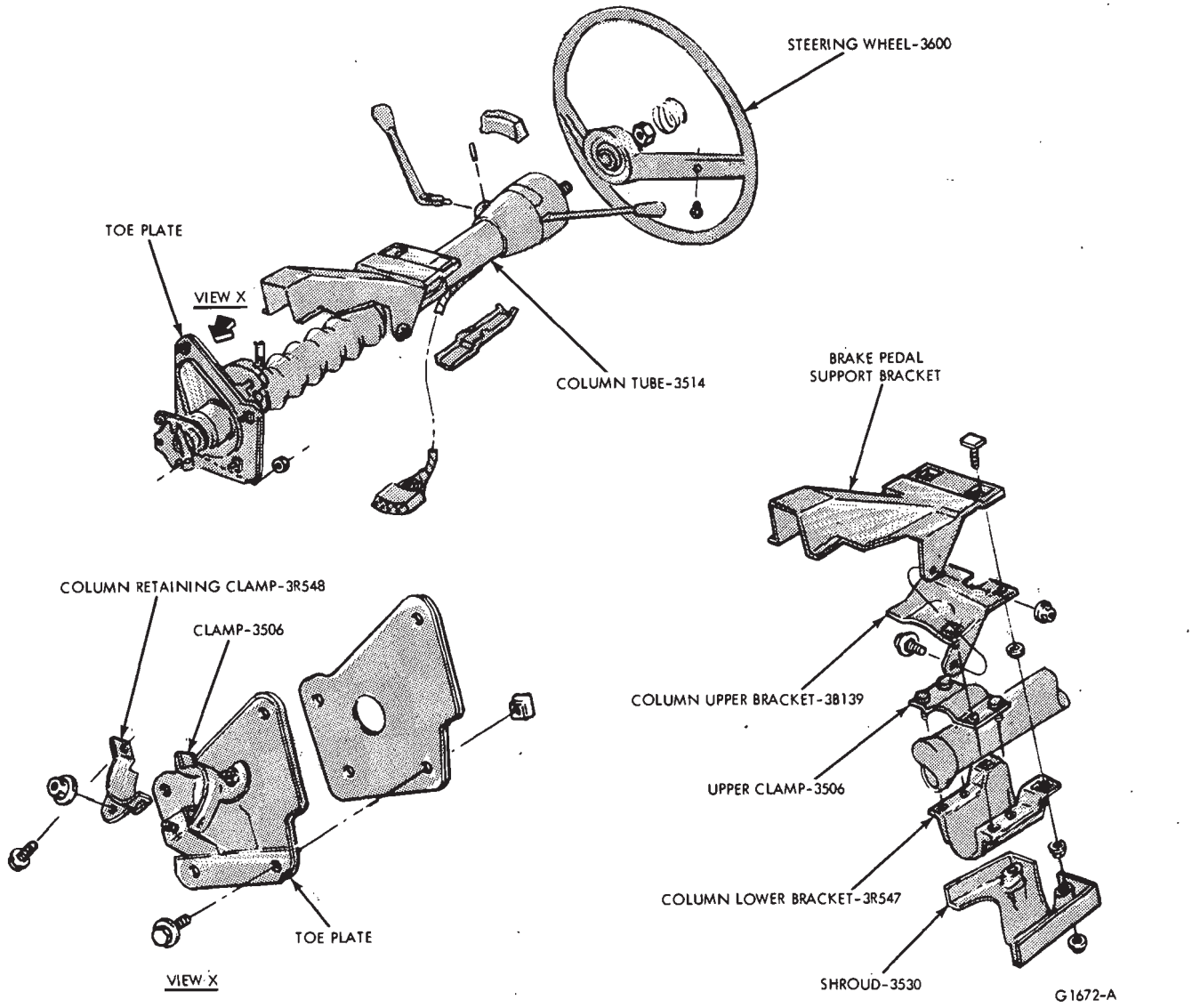

FIG. 5—Steering Column Installation—Maverick

2. Install the three nuts attaching the column upper bracket to the brake pedal support bracket. Leave the nuts loose (Fig. 5).
3. Loosely install the four bolts attaching the toe plate to the dash.
4. Loosely install the bolt attacing the retaining clamp to the column.
5. Install the two nuts retaining the column retaining clamp to the toe plate. Leave the nuts loose.
6. Tighten the retaining clamp to the column bracket.
7. Tighten the four bolts retaining the toe plate to the dash.
8. Tighten the three nuts retaining the column upper bracket to the brake pedal support bracket.
9. Tighten all six nuts, two at a time, that secure the column upper bracket and upper clamp to the column lower bracket.
10. Position the shroud and tighten the two nuts retaining it.
11. Connect the turn signal and neutral switches.
12. Reinstall the package shelf with one screw at the center and two bolts each side. One bolt on the left hand side retains the air duct control.
13. Connect the ignition switch.
14. Install the steering wheel and torque to 30-40 ft-lbs.
15. Connect the two bolts retaining the flex coupling to the steering gear.
16. Connect and adjust the shift linkage.
17. Connect the battery cable to the negative post.
18. Check the operation of the switches.

FALCON

Removal

1. Disconnect the battery cable from the negative post.
2. Disconnect the turn signal switch wires at the connector.
3. Disconnect the neutral start switch (with automatic transmission) and back-up light switch wires from the switches.
4. Disconnect the transmission control rod(s) from the lever(s) at the lower end of the column.
5. Remove the bolt that secures the flex coupling to the steering gear (Fig. 6).
6. Remove the nuts and bolts that secure the column retainer and seal at the toe plate.

7. Disconnect the nuts that secure the column upper and lower brackets to the brake pedal support bracket and the dash panel.
8. Lift the column from the vehicle.

Installation

1. Position the steering column in the vehicle. Make sure that the wheels are in the straight ahead position and that the steering wheel spokes are in a horizontal position when the flex coupling engages the input shaft splines.
2. Install but do not tighten the nuts that secure the column upper and lower brackets to the brake pedal support bracket and the dash panel. Make certain the column is properly positioned relative to the flex coupling input shaft connection.
3. Install and tighten the flex coupling-to-steering gear attaching bolt.
4. Tighten the nuts at the brake pedal support bracket and the dash panel.
5. Install and tighten the nuts and bolts that secure the column retainer and seal at the toe plate.
6. Connect the transmission control rod(s) to the lever(s) at the lower end of the column. Adjust the shift linkage.
7. Connect the neutral start switch (if so equipped) and back-up light switch to their respective terminals.
8. Connect the turn signal switch wires.
9. Connect the battery cable to the negative post.
10. Check the operation of the switches.

FAIRLANE, MONTEGO

Removal

1. Disconnect the negative battery cable.
2. Disconnect the transmission control lever rods.
3. Remove the two nuts retaining the flex coupling to the steering shaft.
4. Remove the four screws from the toe plate assembly (Fig. 7). Loosen the clamp bolt.
5. Remove the instrument panel trim cover retained by two screws.
6. Disconnect the electrical quick couplers at the base of the column.
7. Remove the three nuts from the upper column attaching bracket A.

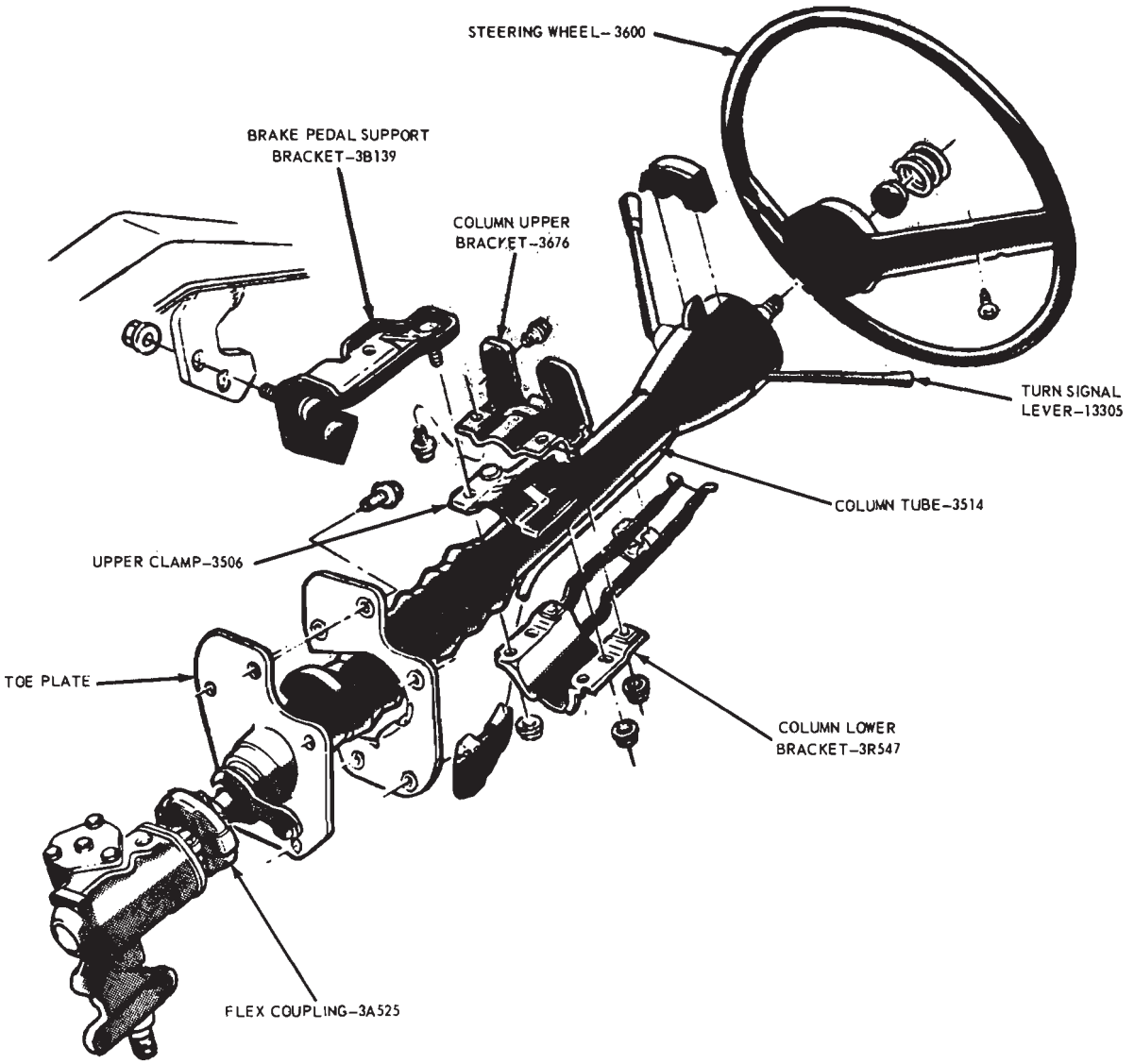

FIG. 6—Steering Column Installation—Falcon G1617-A

Let the column drop down and lift it out of the dash panel.

Installation

1. Install the steering column in the vehicle and lower the steering shaft through the hole in the dash panel.
2. Align the steering shaft with the flex coupling and insert a 1/4-inch diameter rod between the fabric and the flange and tighten the two retaining nuts (10-22 ft-lb).
3. Raise the upper column to contact the two studs in the support bracket C and the one stud in bracket B. Align the column and secure with three nuts. Torque to 13-27 ft-lb.
4. Push the toe plate assembly against the dash panel. Be sure the column shift tube and steering shaft are centered. Secure the four screws (5-15 ft-lb). Tighten the clamp bolt to 5-15 ft-lb.
5. Connect the electrical quick couplers at the base of the steering column. Replace the instrument panel trim cover.
6. Remove the 1/4-inch diameter rod from the flex coupling. Install and adjust the transmission control lever rods and lock rod (if applicable).
7. Connect the negative battery cable.

FORD, MERCURY, METEOR

Removal

1. Disconnect the negative battery cable.
2. Disconnect the transmission control rods.
3. Remove the steering shaft-to-flex coupling connection (one bolt on tilt columns, two bolts on fixed columns).
4. Remove the four nuts (Fig. 8) retaining the toe plate to the dash panel (engine compartment side).
5. From inside the vehicle remove the one additional retaining nut on the toe plate.
6. Disconnect all electrical connections to the steering column.
7. Remove the upper column trim shrouds.
8. Disconnect the PRND21 cable (automatic transmission columns) from the outer tube (1 screw) and the socket pin (cable loop).
9. Remove the three nuts which se-

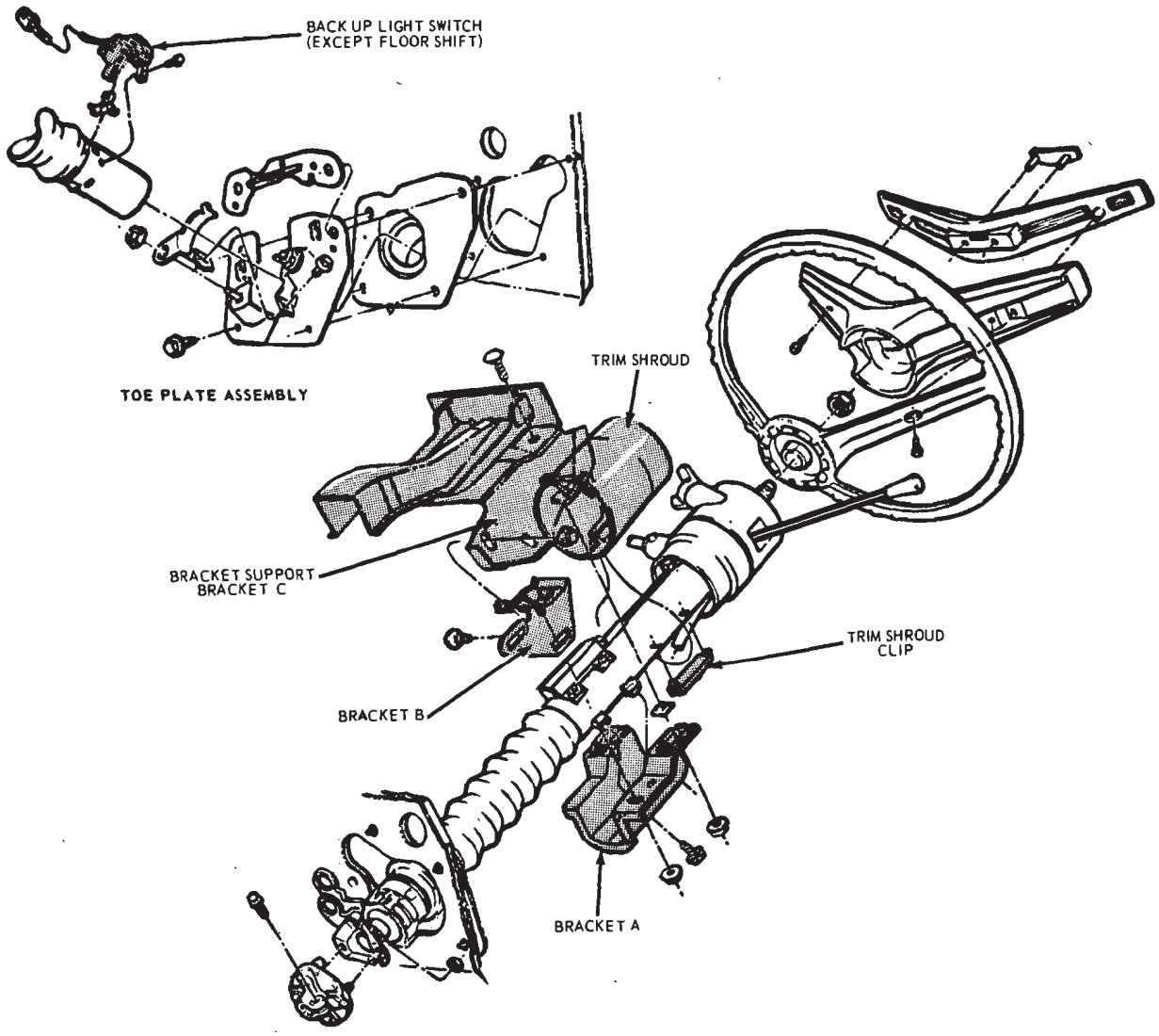

FIG. 7—Fixed Steering Column Installation—Fairlane, Montego

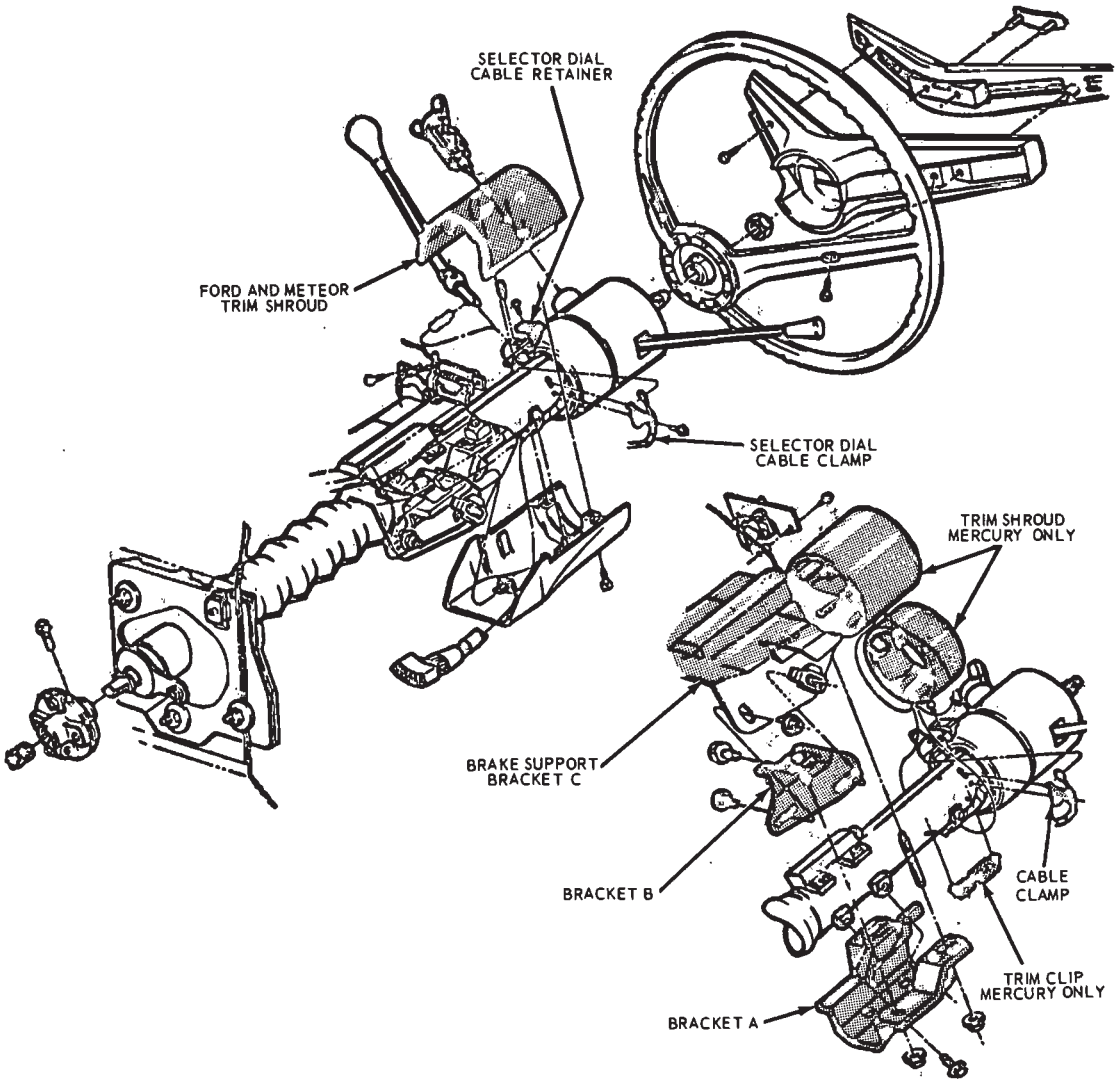

FIG. 8—Typical Steering Column Installation—Ford, Mercury, Meteor

cure the column to the brake support extension.

10. Remove the column from inside the vehicle.

Installation

1. Remove the upper column bracket B and loosely attach it to bracket A with one nut. The bracket must be free to slide relative to the slot in bracket A.

2. Loosen the column opening cover clamp and slide the cover rearward.

3. Insert the steering column through the dash panel opening and engage the steering shaft to the flex coupling. Torque to specification (tilt column, one bolt 20-37 ft-lb; fixed column, two bolts 10-22 ft-lb).

A .15-inch diameter rod should be placed between the fabric and the flange on tilt columns and a 1/4-inch diameter U-shaped rod on fixed columns to prevent distortion.

4. Raise the column over the two studs in the brake support bracket C and install the nuts finger tight. Adjust the column so that it is centered in the instrument panel and torque the nuts 13-27 ft-lb.

5. Column bracket B should be brought flush to the extension lip on the brake support bracket C and the retaining nut to bracket A torque to 13-27 ft-lb.

6. Secure bracket B to the brake support bracket C extension lip with one bolt and one bolt/nut assembly. Torque to 13-27 ft-lb.

7. Push the steering column opening cover D against the dash panel. Center the column shift tube to the steering shaft to prevent grounding and secure the cover in the following order:

a. Tighten the cover nut-to-stud to the inside of the dash panel 96-156 in-lb.

b. Tighten the four cover retaining nuts to the engine side of the dash panel 96-156 in-lb.

c. Tighten or check for the proper torque on the clamp bolt at the base of the column 60-144 in-lb.

8. Remove the flex coupling spacer.

9. Adjust the transmission control indicator-loop cable over the retainer on the socket casting. Position the selector lever in drive (D) position. Tighten the cable bracket to the outer

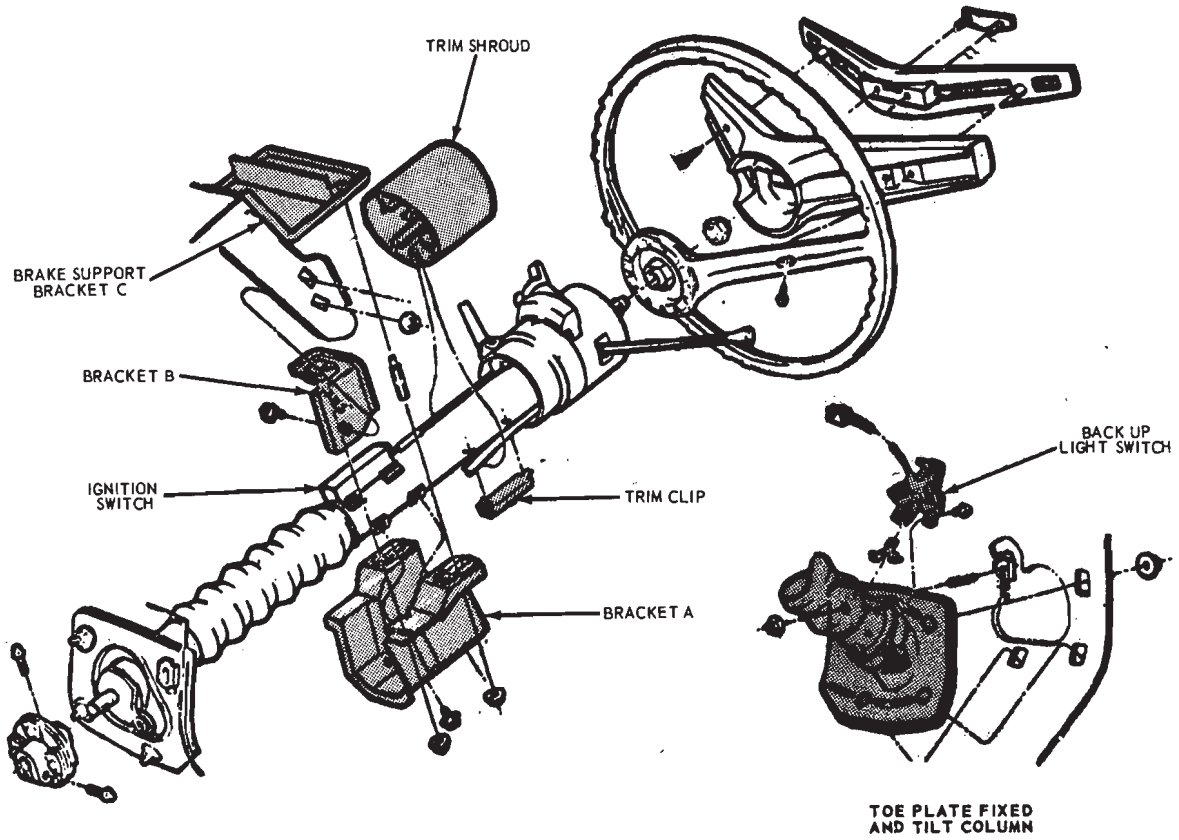

FIG. 9—Fixed Steering Column Installation—Continental Mark III, Thunderbird—(Tilt Column Similar)

tube with the screw to nest the screw to the bracket. Loosen the screw and rotate the bracket to align the indicator over the drive (D) position of the selector lens. Retighten the cable bracket screw.

10. Reconnect all electrical connections to the steering column.

11. Install the trim shrouds.

Ford. Place the upper shroud in position on the steering column. Hook the lower shroud into column bracket A and rotate it against the column. Make sure the index pin fits into the hole on the outer tube. Secure with two screws.

Mercury—Tilt Column. Position the inner and outer shrouds around the column and snap the tabs into the clip. Make sure the inner shroud rib pins are in the holes on the outer tube. Push the outer shroud forward against the instrument panel.

Mercury—Fixed Column. Position the shroud around the column and snap the tabs into the clip. Push it forward against the instrument panel.

12. Reconnect the transmission control rods, lock rod (if applicable), and connect the battery negative cable. Adjust the transmission controls.

THUNDERBIRD, CONTINENTAL MARK III

Removal

1. Disconnect the negative battery cable.

2. Disconnect the transmission control rods.

3. Remove the retaining bolt from the flex coupling-to-steering shaft.

4. Disconnect the column electrical connectors.

5. Remove the steering column trim cover from the instrument panel.

6. Remove the four nuts (Fig. 9) holding the toe plate to the dash panel.

7. Remove the three nuts holding bracket A to bracket B and C.

8. Lift the column out of the dash panel and remove from the vehicle.

Installation

1. Place the column in the vehicle and insert the steering shaft through the opening in the dash panel.

2. Align the steering shaft with the flex coupling and insert. Install a

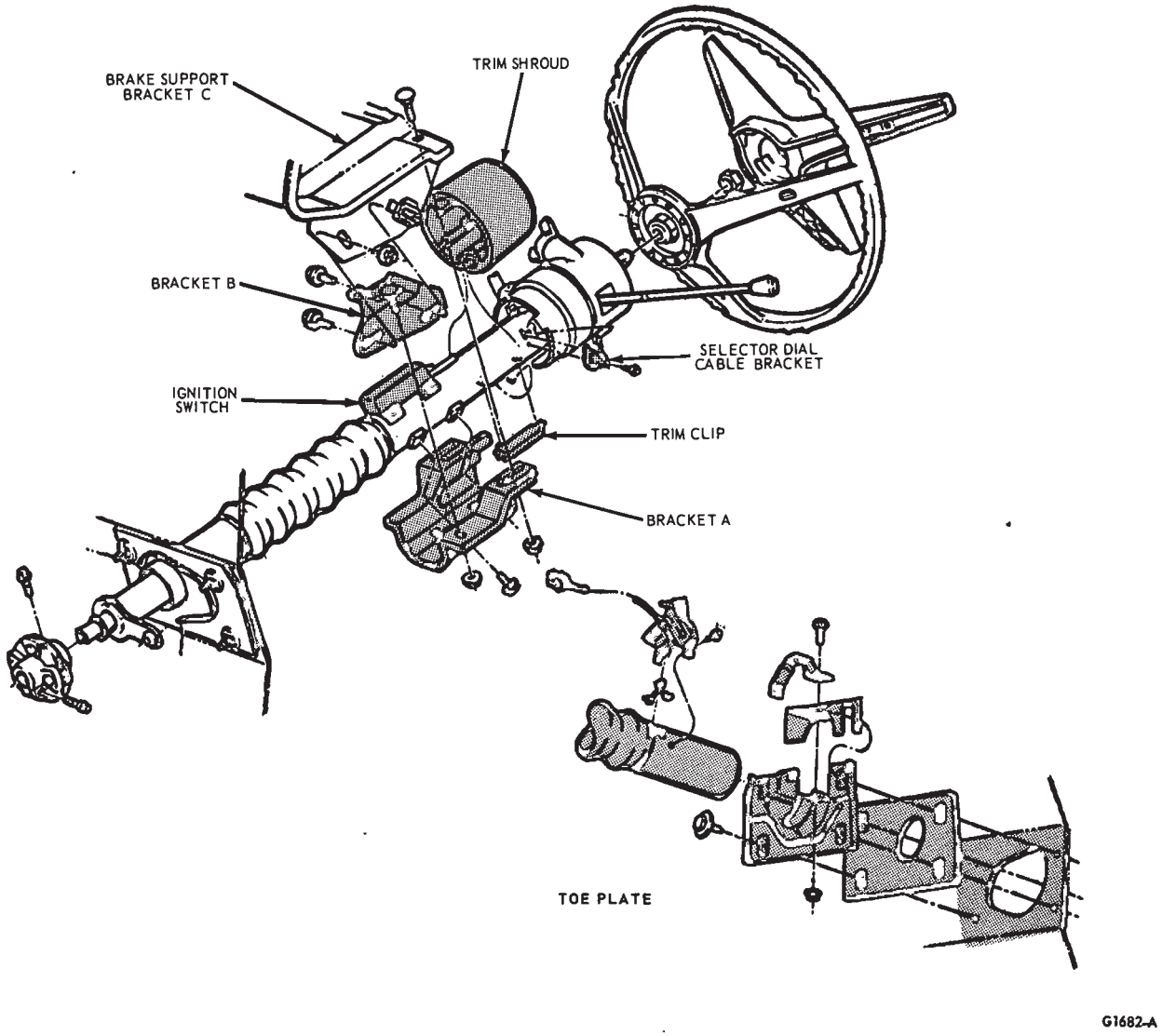

FIG. 10—Fixed Steering Colmn Installation—Lincoln Continental—(Tilt Column Similar)

.15-inch diameter rod between the fabric and flange.

3. Loosen the two bolt/nut assemblies on bracket B to allow the bracket to move in the slotted portion of bracket C.

4. Raise the steering column over the studs from bracket C and B. Align the column and tighten the three nuts to 13-27 ft-lb.

5. Jam the toe plate tightly against the dash panel. Center the column shift tube to the steering shaft and secure the toe plate with four nuts to 96-156 in-lb. Torque the toe plate clamp nut to 60-144 in-lb.

6. Secure the bracket B nut/bolt assemblies to the extension bracket C to 18-48 ft-lb torque.

7. Reconnect the electrical quick couplers.

8. Install the steering column trim cover.

9. Tighten the flex coupling bolt to the steering shaft to 20-37 ft-lb. Remove the .15-inch diameter rod.

10. Connect the transmission control rods and the negative battery cable. Adjust the shift linkage.

LINCOLN CONTINENTAL

Removal

1. Disconnect the negative battery cable.

2. Disconnect the transmission control rods.

3. Remove the bolt retaining the flex coupling to the steering shaft.

4. Remove the four screws retaining the toe plate to the dash panel (Fig. 10).

5. Disconnect all column wiring quick couplers.

6. Remove the steering column trim cover from the instrument panel.

7. Disconnect the transmission selector dial cable from the column and loop it on the socket casting. Allow it to hang free.

8. Remove the three retaining nuts holding the upper column retaining bracket A in place.

9. Lift the column out of the dash panel and remove from the vehicle.

Installation

1. Place the column in the vehicle and insert the lower end of steering shaft through the dash panel opening.

2. Align the steering shaft with the

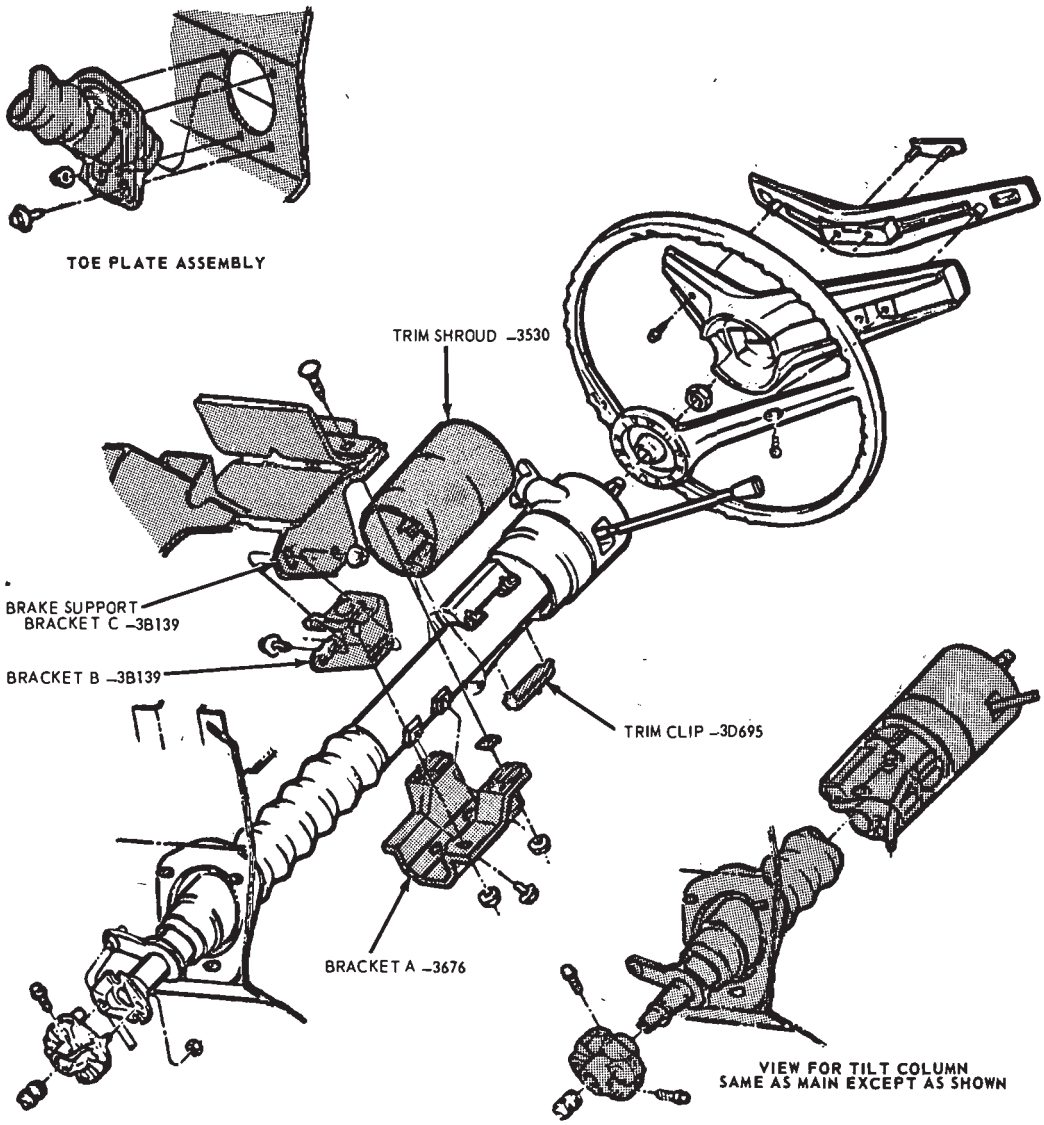

FIG. 11—Tilt Column Mechanism

flex coupling and insert the shaft. Place a .15-inch diameter rod between the fabric and flange.

3. Loosen the bolt and bolt/nut assembly retaining bracket B to the flange of bracket C.

4. Raise the steering column and slide bracket A over the two studs in the brake support bracket C and the one stud in bracket B. Hold bracket B securely against the extension flange of brake support bracket C. Align the upper column and secure the three nuts to attach bracket A to bracket B and C. Torque to 13-27 ft-lb.

5. Jam the toe plate assembly against the dash panel. Center the column shift tube to the steering shaft and secure the toe plate with four screw/washer assemblies 5-15 ft-lb.

6. Secure the retaining bolt and bolt/nut assembly on bracket B to bracket C with 13-27 ft-lb torque.

7. Reinstall the shift selector dial cable by looping the cable over the retainer on the socket casting and position the gear shift lever in drive (D) position. Tighten the cable bracket to the steering column outer tube to align the screw and bracket. Loosen the screw and rotate the cable bracket around the outer tube until the selector pointer is aligned with letter D in the instrument cluster and retighten the screw.

8. Replace the electrical wiring quick couplers.

9. Replace the steering column trim cover and trim shrouds using a new retainer, if necessary.

10. Secure the flex coupling bolt 20-37 ft-lb and remove the .15-inch diameter rod.

11. Connect and adjust the shift linkage.

12. Replace the negative battery cable.

TILT COLUMN MECHANISM

REMOVAL

1. Disconnect the negative battery terminal.

2. Disconnect the steering shaft at the flex coupling.

3. Remove the steering wheel trim pad, the steering wheel, and the turn signal lever. The steering wheel should be in the full up position.

4. Disconnect the quick coupler for the turn signal wiring at the lower

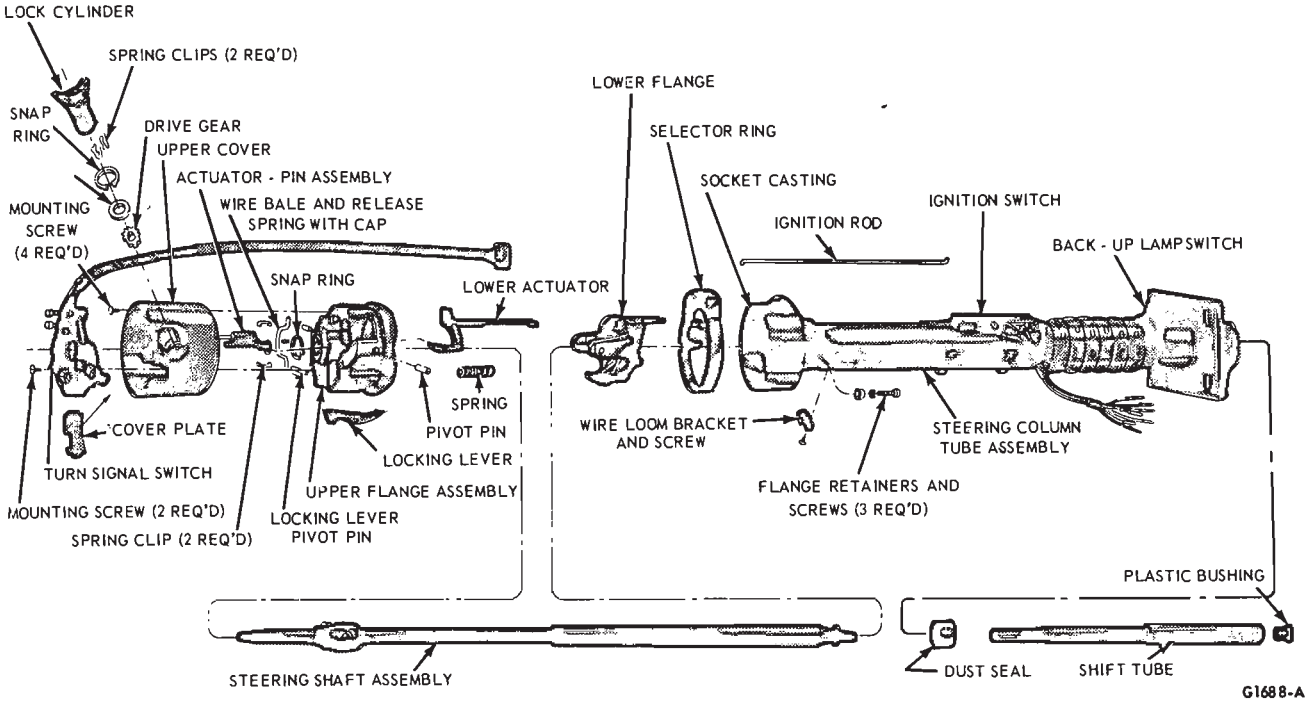

FIG. 12—Typical Tilt Column Disassembled (Fixed Column Similar)

end of the column (Fig. 11).

5. Remove the two screws on the turn signal switch. Remove the wire harness retainer screw and clip on the upper column outer tube. Lift the switch over the steering column shaft.

6. Place the gear shift selector in P (park) position and insert a wire pin in the ignition lock hole located between the lock cylinder housing and the warning flasher button on the cover casting.

7. Turn the ignition key to **on** position, depress the wire pin, and lift out the lock cylinder.

8. Remove the lock cylinder spring clips inside the lock cylinder housing.

9. Using a flat blade screwdriver, insert the blade into the recess in the drive gear at the bottom of the lock cylinder housing. Turn the drive gear three notches in a counterclockwise direction. Remove the snap ring, the washer, and the drive gear (Fig. 11). Note the position of the drive gear to the upper actuator teeth.

10. Remove the four phillips screws on the cover casting and lift it up over the shaft and turn signal switch and remove it. The upper actuator can also be removed at this point.

11. Remove the three screws to allow the selector dial ring to be removed (if applicable). See Fig. 12. If the column has a remote selector dial pointer cable system, remove the cable attachment during the removal of the trim shrouds as described in the next step.

12. Remove the upper column trim shroud(s), the steering column instrument panel trim cover, and the attaching bolts holding the column brackets to the brake support bracket. Allow the column to drop down exposing the ignition switch.

13. Remove the three allen screws holding the lower flange casting to the outer tube. These screws are located under the socket casting on the outer tube.

14. Remove the ignition switch rod connection at the ignition switch. It will probably be necessary to start the flange assembly out of the column to allow enough free play to disconnect the ignition switch rod.

15. Remove the two spring clips holding the wire bale which acts as a release lever for the locking lever. Remove the wire bale (Fig. 13).

16. With a small drift, drive out the pin holding the locking lever. Remove the locking lever and spring. A C-clamp may be used to relieve the tension on the pin during removal if necessary.

17. Remove the steering shaft snap ring.

18. The upper and lower flange castings can now be separated by removing the two pivot pins located in the side of the casting assembly with either tool T65P-3D739-A or tools T70P-3D739-A and T67P-3D739-A.

19. After the upper and lower flange castings are separated it will be possible to remove the lower actuator with the ignition switch rod attached.

20. Removal of the socket casting requires rotating the inner tube and socket casting to expose the casting retaining bolt. Removing the bolt allows the casting to be lifted off the shift tube.

INSTALLATION

1. Install the socket casting and tighten the retaining bolt.

2. Assemble the upper and lower flange castings to the steering shaft including the locking lever, the bale, the ignition switch rod (lower actuator) and the turn signal wire harness. The flange assembly pivot pins should be pressed in place using a C-clamp (Fig. 16).

3. Install the steering shaft including the tilt mechanism into the column.

4. Hook up the ignition switch rod

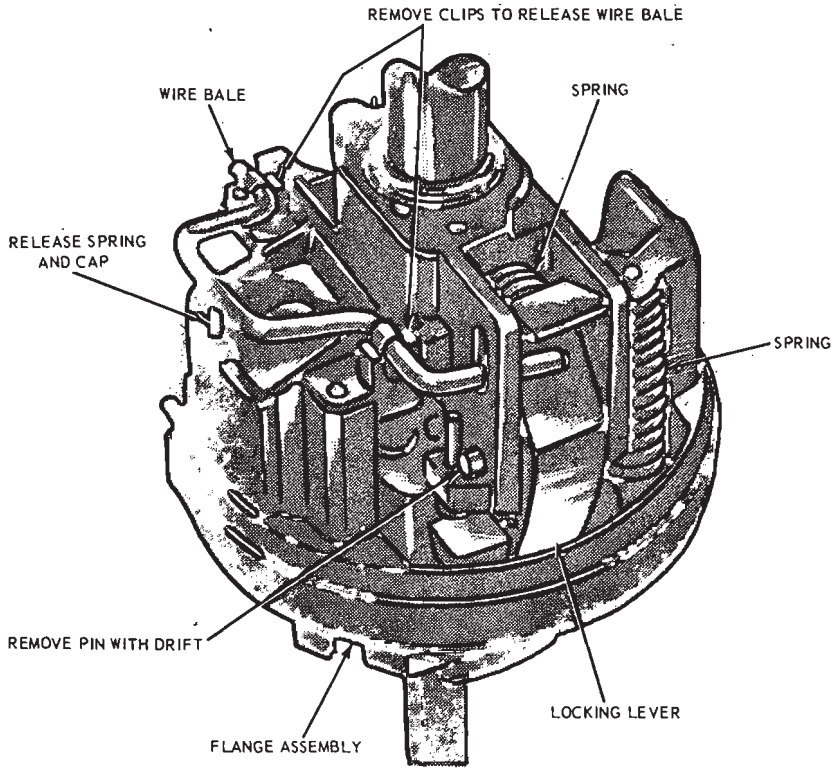

FIG. 13—Removing Wire Bale and Tilt Locking Lever

to the lower actuator and tighten the three allen screws holding the flange assembly to the outer tube. New allen screws must be used each time the unit is assembled to insure that epoxy cement on the screws will bond properly.

5. Install the locking mechanism upper actuator (rack) and the outer cover.

6. Install the turn signal switch.

7. Install the lock cylinder drive gear, washer, snap ring, spring clips, and lock cylinder (Fig. 11). Install the turn signal lever.

8. Turn the key to the **off** position to extend the lock cylinder retaining pin into the flange.

9. Adjust the ignition switch.

10. Install the column attaching bolts, trim shroud(s), steering wheel and trim pad.

LOCK CYLINDER ASSEMBLY (FIXED OR TILT COLUMN) REMOVAL AND INSTALLATION

REMOVAL

1. Disconnect the negative battery terminal cable.

2. **Fixed column units**—Remove the steering wheel trim pad and steering wheel. Insert a wire pin in the lock cylinder hole located inside the column halfway down the housing.

Tilt column units—Insert a wire pin in the hole located on the outside of the flange casting adjacent to the turn signal warning flasher button.

3. Place the gear shift lever in P (park) position.

4. With the ignition key, turn the lock cylinder to **on** position.

5. Remove the lock cylinder by depressing the wire pin and pulling up on the cylinder; then, remove the wire pin.

INSTALLATION

1. Insert the lock cylinder into the cylinder housing in the flange casting and turn the key to **off** position. This action will extend the lock cylinder retaining pin into the flange.

2. With the key in the lock, cycle the cylinder to insure correct operation in all positions.

3. On fixed column units, replace the steering wheel and trim pad.

4. Reconnect the battery cable.

DRIVE GEAR (FIXED OR TILT COLUMN) REMOVAL AND INSTALLATION

REMOVAL

1. Disconnect the negative battery terminal cable.

2. Remove the ignition lock cylinder.

3. Remove the lock cylinder spring clips.

4. Place the gear shift selector in P (park) position.

5. Using a flat blade screwdriver insert the blade into the recess in the drive gear at the bottom of the lock cylinder housing. Turn the drive gear three notches in a counterclockwise direction. Remove the snap ring, washer, and drive gear. Note the position of the drive gear to the rack teeth.

INSTALLATION

1. Install the drive gear into the base of the lock cylinder housing in the same position noted during removal. Position is correct if the last drive gear tooth and the last tooth on the rack are meshed. Install the washer and snap ring.

2. With the screwdriver blade, turn the drive gear three notches clockwise. Install the lock cylinder spring clips.

3. Install the lock cylinder and connect the negative battery cable.

4. Check for correct operation.

ACTUATOR AND STEERING WHEEL LOCK PIN (FIXED COLUMN) REMOVAL AND INSTALLATION

REMOVAL

1. With the negative battery cable disconnected, remove the steering wheel trim pad and the steering wheel.

2. Remove the three screws attaching the turn signal switch. Disconnect the quick coupler at the lower end of the steering column. Remove the turn signal lever. Lift the turn signal switch over the steering shaft and lay to one side.

3. Remove the ignition lock cylinder and drive gear.

4. After the drive gear is removed, remove the two nuts that hold the T bolts (Fig. 14) in the base of the flange casting and the snap ring retainer on the steering shaft. Lift up on the flange casting to slide the rack out of the housing in the flange casting.

5. Remove the shroud(s) on the steering column to expose the rod attachment at the ignition switch.

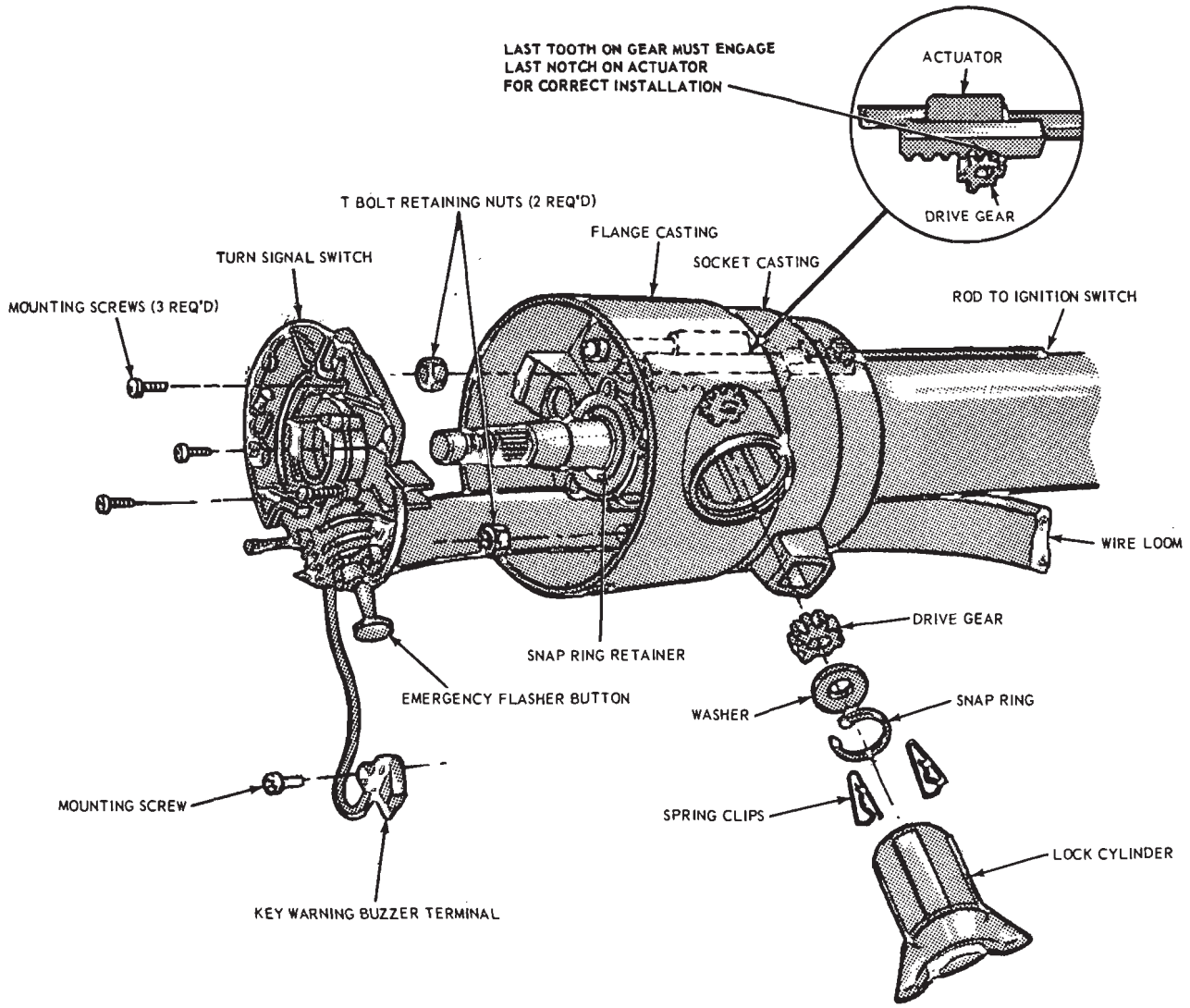

FIG. 14—Fixed Column Mechanism

6. Remove the column attaching bolts at the instrument panel to allow the column to drop down. Disconnect the rod between the actuator and ignition switch and remove the actuator (Mustang/Cougar vehicles do not require dropping the column to reach the ignition switch).

7. The spring loaded steering wheel lock pin is located in the actuator and removal is accomplished by removing the retaining clip at the lower end of the pin. When pulling the pin out of the casting, care should be taken not to lose the spring. A new clip must be used each time a pin is removed.

INSTALLATION

1. If removed, replace the steering wheel lock pin in the actuator casting. Always use a new retaining clip.

2. Connect the rod link to the ignition switch.

3. Install the T bolts to the flange casting with nuts on the first thread. Slide the flange casting down on the column while guiding the actuator into the housing and starting the T bolts. Tighten the T bolt nuts and replace the snap ring on the steering shaft.

4. Install the drive gear and ignition lock cylinder.

5. Install the turn signal switch and the turn signal lever.

6. Install the steering wheel and trim pad.

7. Reconnect the battery cable.

8. Adjust the ignition switch and replace the column attaching bolts and trim shrouds.

FLANGE CASTING AND/OR SOCKET CASTING (FIXED COLUMN) REMOVAL AND INSTALLATION

REMOVAL

1. Disconnect the negative battery cable.

2. Remove the steering wheel trim pad and steering wheel.

3. Remove the ignition lock cylinder.

4. Remove the drive gear.

5. Disconnect the turn signal switch at the quick coupler on the lower column and lift it over the shaft.

6. Remove the two nuts holding the T bolts in the base of the flange

casting (Fig. 14) and the snap ring retainer on the steering shaft. The flange casting can now be removed. The locking rack will remain on the column.

7. To remove the socket casting, rotate the casting to expose the retaining bolt and remove the bolt. Vehicles with a remote gear shift selector dial will require disconnecting the selector cable prior to removing the socket casting.

INSTALLATION

1. Reinstall the socket casting and tighten the bolt.
2. Install the T bolts to the flange with the nuts started. Install the flange casting making sure the actuator is properly located as the flange is installed. Tighten the two nuts on the T bolts and install the snap ring to the steering shaft.
3. Install the turn signal switch. Connect the wiring quick coupler.
4. Install the lock mechanism drive gear and the ignition lock cylinder.
5. Install the steering wheel and trim pad.
6. Remove the column trim shroud(s) and the attaching bolts as required to allow the column to drop down and expose the ignition switch.
7. Adjust the ignition swtich as detailed in Group 33 of this manual.
8. Install the column attaching bolts and the trim shroud.
9. Connect the negative battery cable.

ACTUATOR, STEERING WHEEL LOCK PIN AND FLANGE CASTING (TILT COLUMN) REMOVAL AND INSTALLATION

REMOVAL

1. Disconnect the negative battery cable.
2. Disconnect the steering shaft at the flex coupling.
3. Remove the steering wheel trim pad, steering wheel, and the turn signal lever.
4. Remove the ignition lock cylinder and drive gear using the appropriate procedure (Fig. 11).
5. Remove the turn signal lever.
6. Remove the two screws on the turn signal switch and the one screw on the warning buzzer terminal. Lift the switches off the steering shaft.
7. Remove the four phillip screws on the cover casting and remove it. The cover will have to be maneuvered over the turn signal switch.

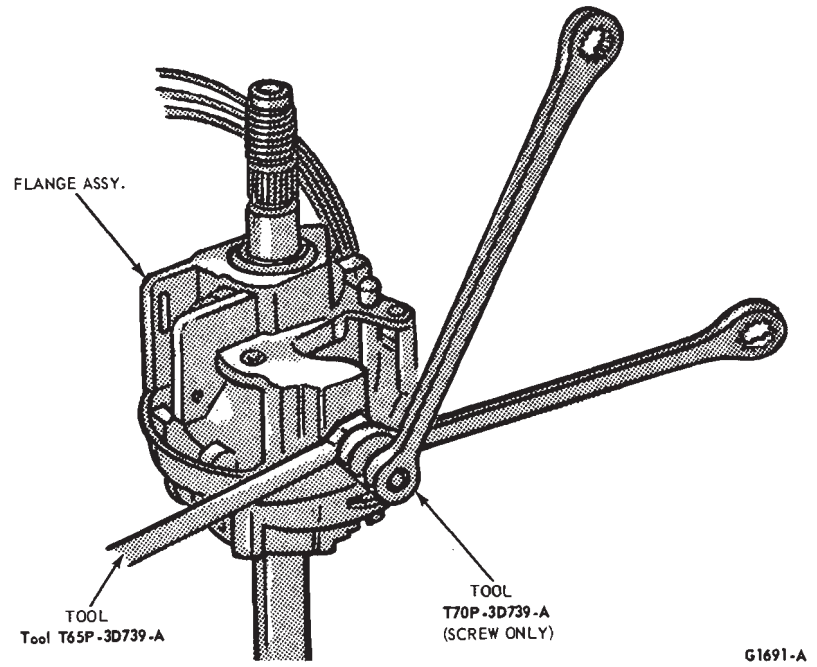

FIG. 15—Removing Pivot Pin

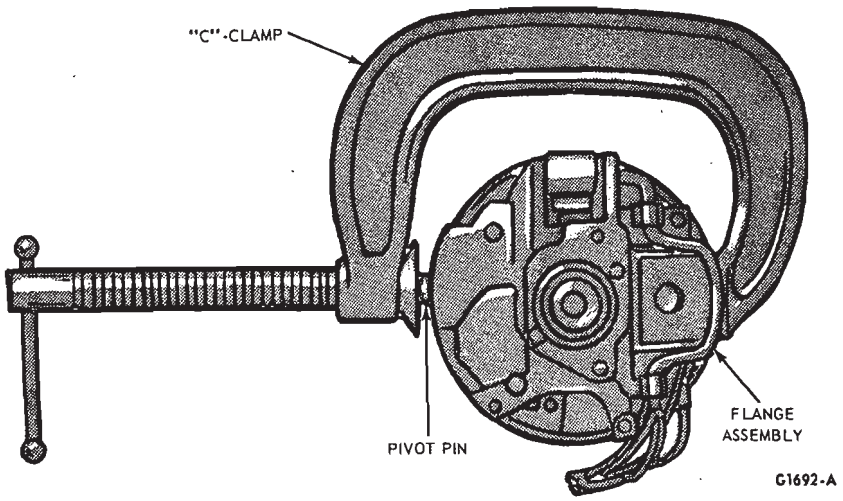

FIG. 16—Installing Flange Assembly Pivot Pins

8. Remove the upper column trim shroud(s) and remove the attaching bolts holding the column to the instrument panel. Allow the column to drop down to expose the ignition switch.
9. The lock actuator can be removed by working the ignition rod to give clearance for the actuator attaching pin at the lower actuator.
10. Remove the steering wheel lock pin by removing the retaining clip at the bottom of the pin located in the actuator casting. A new clip must be used when replacing the pin.
11. Remove the three allen screws located under the lower socket casting.
12. Lift upward on the flange casting assembly to start the shaft out of the column. This will allow enough free play to allow the ignition switch rod to be removed at the ignition switch. It may be necessary to rotate the shaft to help the rod disengage.
13. Removal of the lower actuator, which is the connection between the upper actuator and the rod that leads to the ignition switch, will necessitate separating the upper and lower flange castings. To separate the flange castings, removal of the pivot pins is necessary using either tool T65P-3D739-A or tools T70P-3D739-A and T67P-3D739-A (Fig. 15).
14. The lower or socket casting

removal is accomplished by rotating the socket and shift tube to expose the bolt on the socket casting. Removal of this bolt through the hole in the outer tube will allow the casting to be lifted off the column.

INSTALLATION

1. Install the socket casting to the inner column tube with one bolt.
2. Reassemble the inner flange castings and rack linkage.
3. Attach the ignition switch rod to the ignition switch. Slide the inner flange assembly down on the socket casting and tighten the three allen screw bolts securely. New screws must be used to insure that the epoxy cement on the threads will provide a proper bond.
4. Attach the actuator casting to the lower actuator from the ignition switch rod.
5. Install the cover casting with four phillips screws to the inner flange assembly. The cover must be press fitted on the pin located on the upper flange (Fig. 16). The actuator casting must be properly located in the housing of the cover casting to permit the casting to slide into place.
6. Install the steering shaft snap ring, the turn signal switch and the turn signal lever.
7. Install the drive gear and the lock cylinder.
8. Adjust the ignition switch.
9. Install the upper steering column attaching bolts and trim shroud(s).
10. Connect the negative battery cable.

4 MAJOR REPAIR OPERATIONS

STEERING COLUMN SHIFT TUBE REMOVAL AND INSTALLATION

REMOVAL

1. Remove the steering column from the vehicle as described in Removal and Installation section of this Part.
2. Place the column in a vise and secure.
3. Remove the back-up lamp switch and turn signal lever.
4. Remove the turn signal switch and wire harness retainer and position out of the way.
5. Remove the upper bearing snap ring and remove the steering shaft assembly from the bottom end of the column.
6. Remove the bolt retaining the shift tube to the selector housing and remove the shift tube from the housing.

INSTALLATION

1. If applicable, transfer the shift linkage and bushing retainer to the new shift tube.
2. Position the shift tube in the housing and install the retaining bolt.
3. Install the steering shaft in the column and install the upper bearing snap ring.
4. Place a piece of 3/4 inch ID x 2 1/8 inch long pipe over the end of the shaft and install the steering wheel nut.
5. Tighten the nut until the bearing is seated; then, remove the nut and pipe from the shaft.
6. Install the wire harness retainer and turn signal switch.
7. Install the turn signal lever and back-up lamp switch.
8. Remove the column from the vise and install in the vehicle as described in the Removal and Installation section of this Part.

5 SPECIAL SERVICE TOOLS

Tool No.	Description
T67L-3600-A	Steering Wheel Remover
T65P-3D739-A	Pivot Pin Remover
T70P-3D739-A	Pivot Pin Remover
T67P-3D739-A	Pivot Pin Remover

CG1716-A

PART 13-03 *Steering Linkage*

COMPONENT INDEX Applies To Models As Indicated	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Maverick	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
ADJUSTING SLEEVE Removal and Installation	03-04												
CENTER LINK Removal and Installation	03-04												
HOISTING INSTRUCTIONS	03-01												
PITMAN ARM Removal and Installation	03-05												
SPINDLE CONNECTING ROD ASSEMBLY (INNER AND OUTER ENDS) Removal and Installation		03-01	03-01	03-01	03-01	03-01	03-01	03-01	03-01	03-01	03-01	03-01	03-01
STEERING IDLER ARM AND BRACKET ASSEMBLY Removal and Installation	03-05												
STEERING LINKAGE Description	03-01												

A page number indicates that the item is for the vehicle(s) listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle(s) listed.

1 DESCRIPTION

The manual and non-integral power steering linkage (Figs. 1 through 5) consists of the Pitman arm, the Pitman arm-to-idler arm (center link), the idler arm and bracket assembly and the spindle connecting sleeve and end assemblies (tie rods). **Do not attempt to straighten bent linkage; use new parts.**

2 REMOVAL AND INSTALLATION

HOISTING INSTRUCTIONS

Damage to suspension and/or steering linkage components may occur if care is not exercised when positioning the hoist adapters of 2 post hoists prior to lifting the vehicle.

If a 2 post hoist is used to lift the vehicle, place the adapters under the front suspension lower arms. **Do not allow the adapters to contact the steering linkage.**

SPINDLE CONNECTING ROD ASSEMBLY (INNER AND OUTER ENDS) REMOVAL AND INSTALLATION

COUGAR, FAIRLANE, FALCON, MONTEGO, MAVERICK, MUSTANG

The spindle connecting rod ends, which are threaded into the adjusting sleeves, have non-adjustable, ball studs. These parts cannot be greased or serviced. A rod end assembly should be replaced when excessive looseness at the ball studs is noticed.

1. Remove the cotter pin and nut from the worn rod end ball stud.
2. Disconnect the end from the spindle arm or center link as shown in Figs. 1 through 5.
3. Loosen the connecting rod sleeve clamp bolts, and count the number of turns needed to remove the rod end from the sleeve. Discard all rod end parts that were removed from the sleeve. **All new parts should be used when a spindle connecting rod end is replaced.**
4. Thread a new rod end into the sleeve, but do not tighten the sleeve clamp bolts at this time.
5. Insert the stud in the part from which the old one was removed, and install the stud nut. Torque the nut to specification and install the cotter pin.
6. Check and, if necessary, adjust toe-in (Part 13-01). **Loosen the clamps from the sleeve. Oil the sleeve, clamps, bolts and nuts. Tighten the clamp nuts to specification after toe-in is adjusted.** The tie rod sleeve clamps must be installed as shown in Fig. 11, Part 14-01 to prevent interference with the side rail.

FORD, MERCURY, METEOR, THUNDERBIRD, LINCOLN CONTINENTAL, CONTINENTAL MARK III

1. Raise the end and install safety stands. Remove the cotter pin and nut from the worn rod end ball stud.
2. Loosen the connecting rod sleeve clamp bolts, and remove the rod end

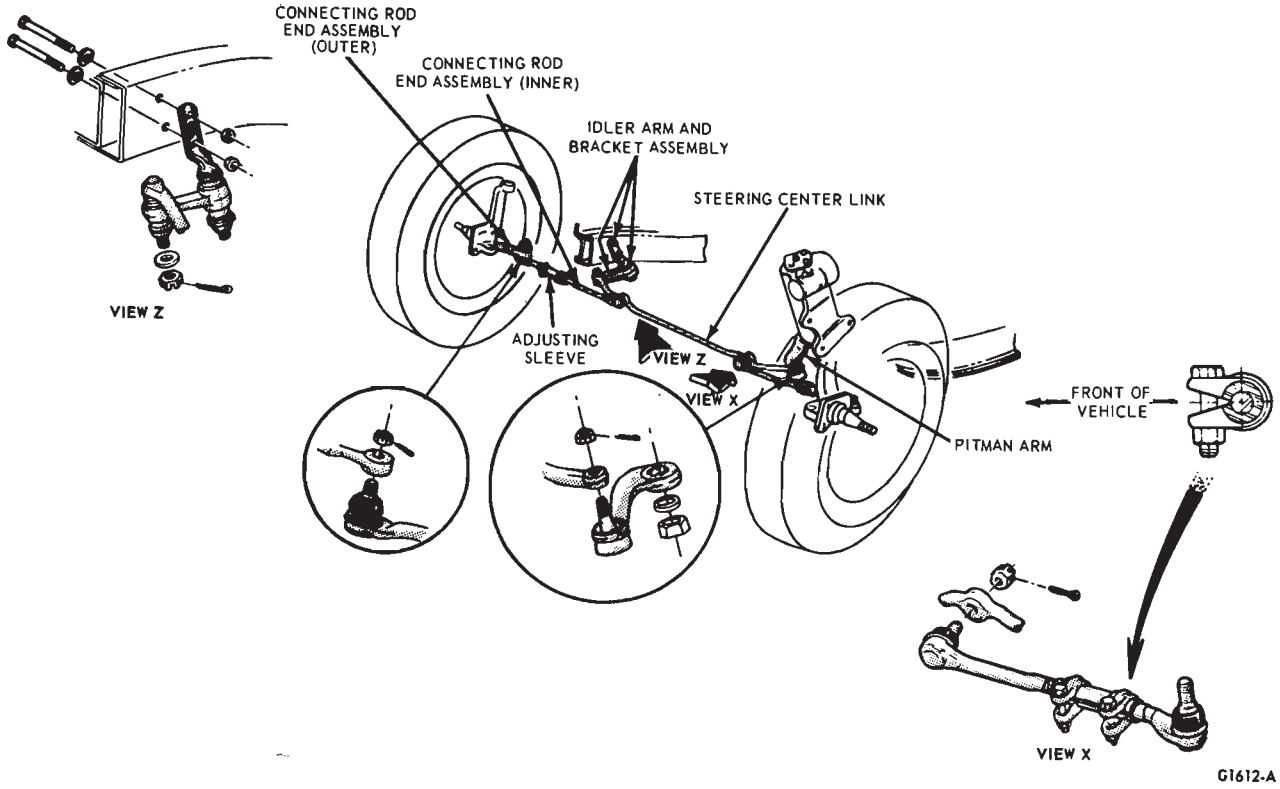

FIG. 1—Manual Steering Linkage—Cougar, Fairlane, Falcon, Montego, Mustang

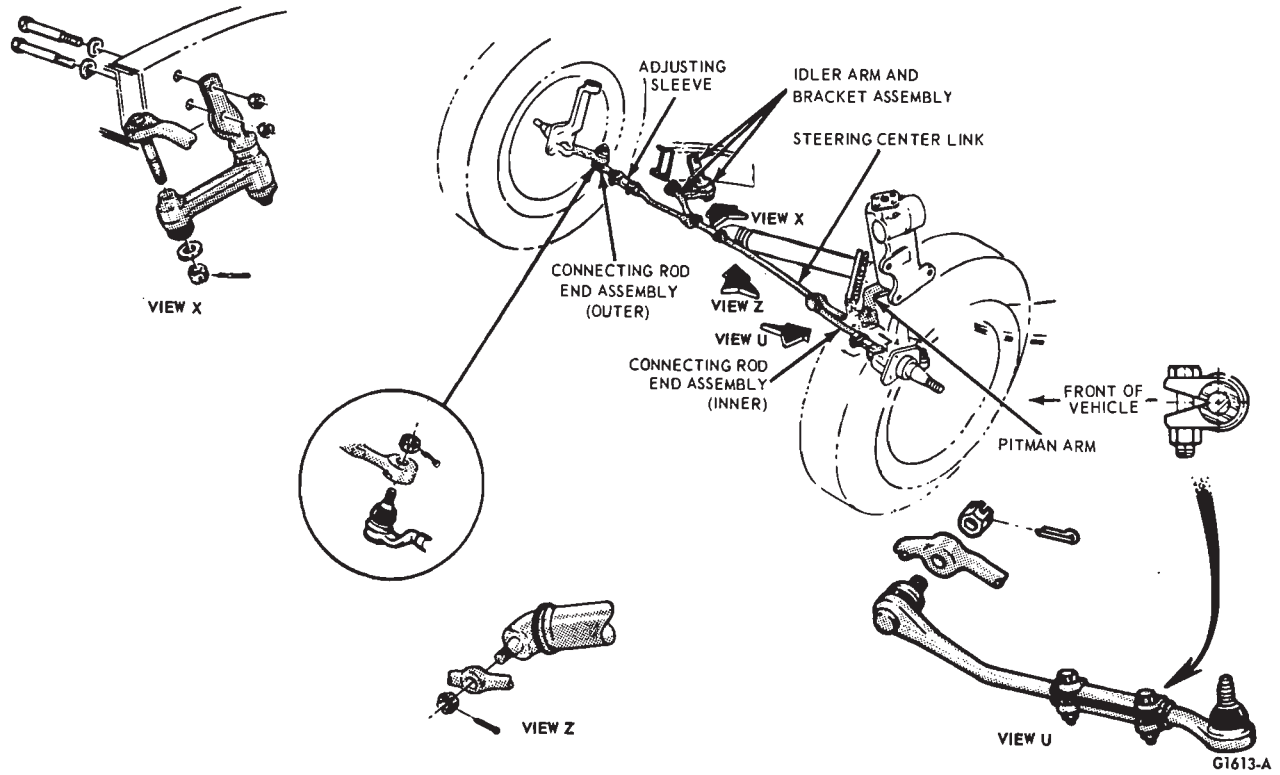

FIG. 2—Non-Integral Power Steering Linkage—Cougar, Fairlane, Falcon, Montego, Mustang (Maverick Similar)

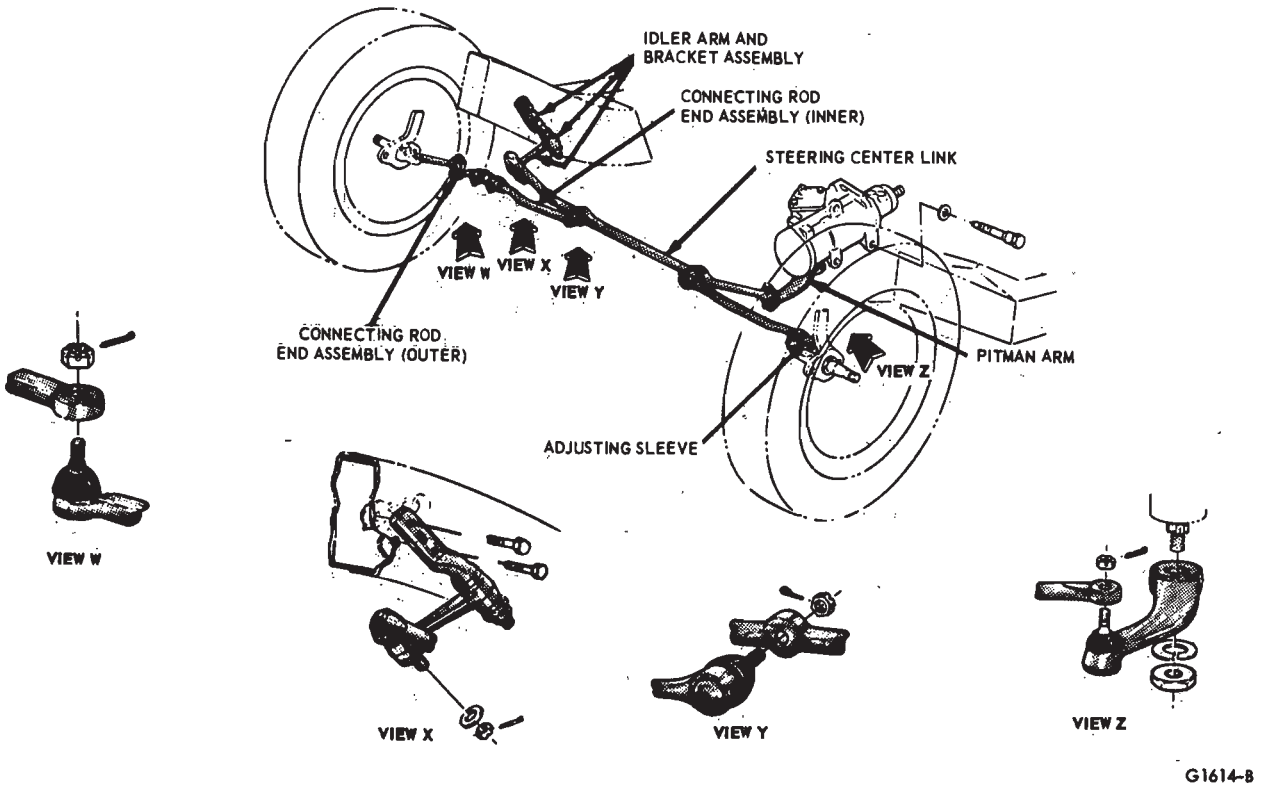

FIG. 3—Manual or Power Steering Linkage—Ford, Mercury, Meteor, Thunderbird, Continental Mark III

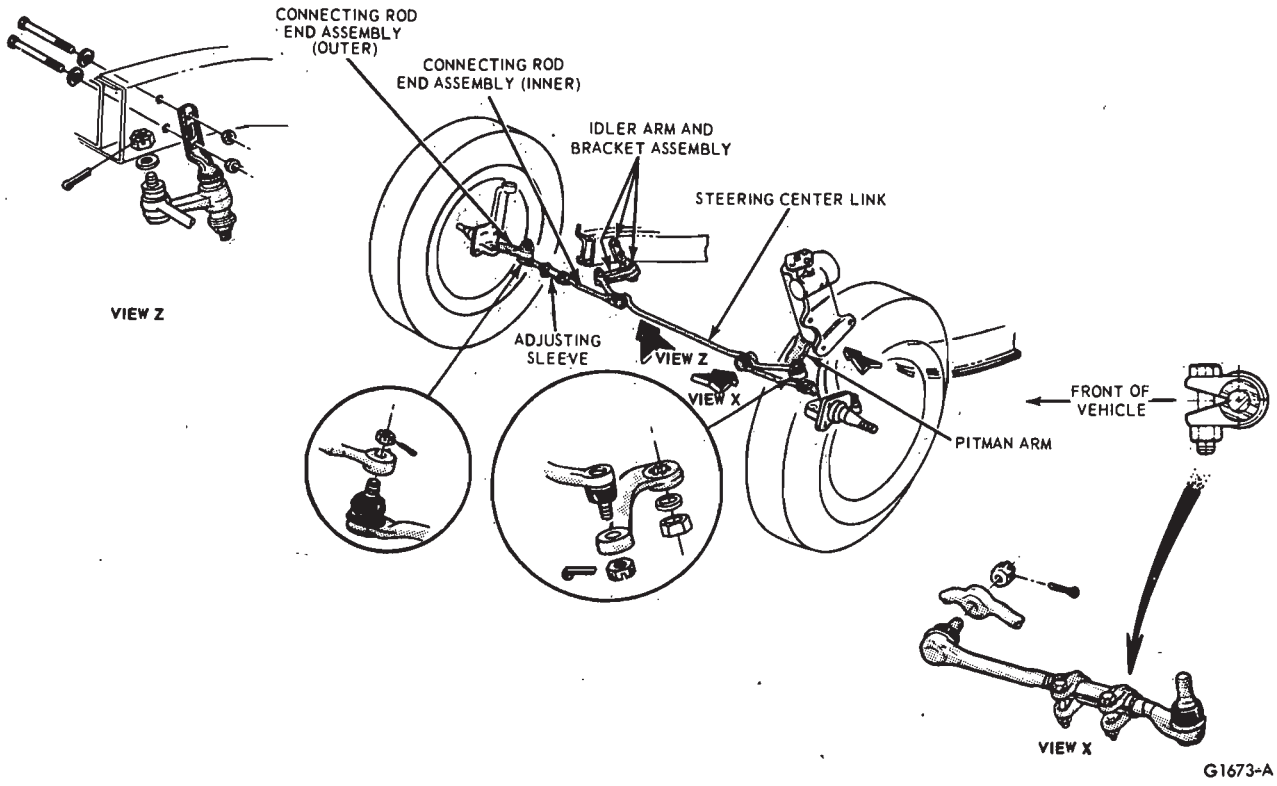

FIG. 4—Manual Steering Linkage—Maverick

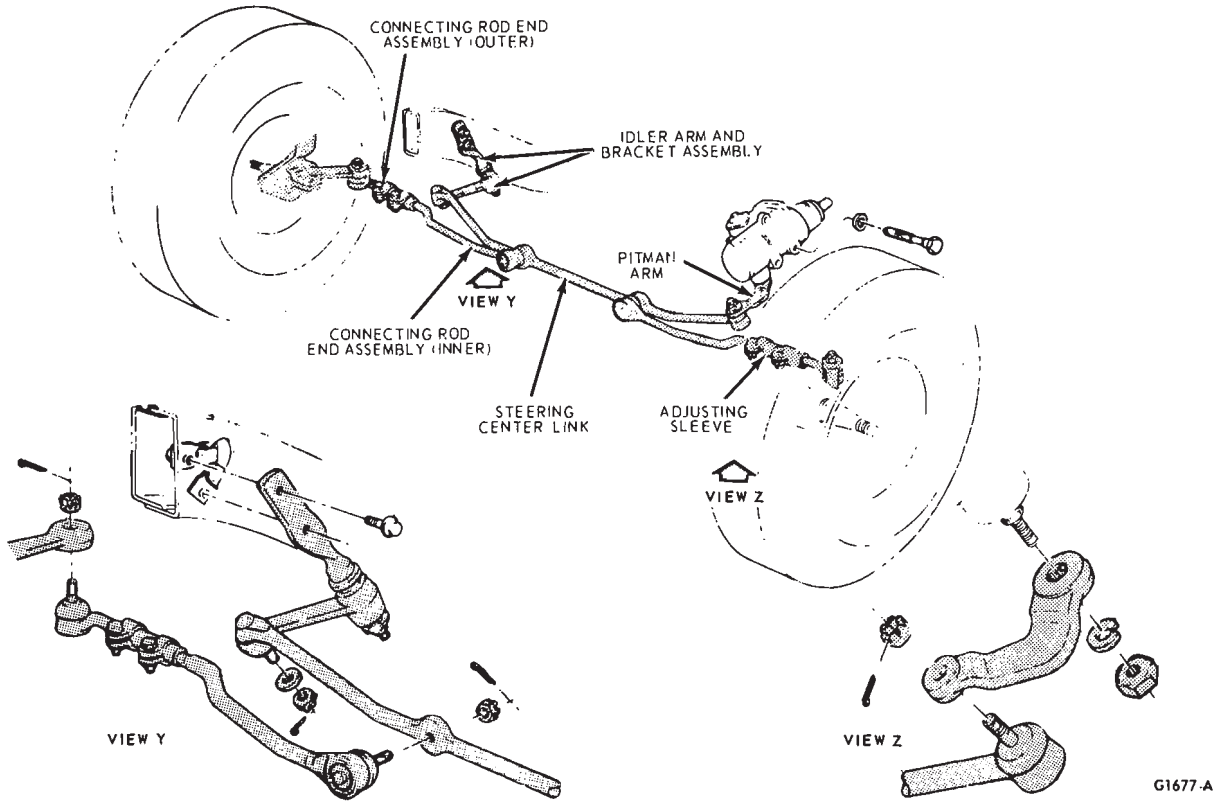

FIG. 5—Steering Linkage—Lincoln Continental

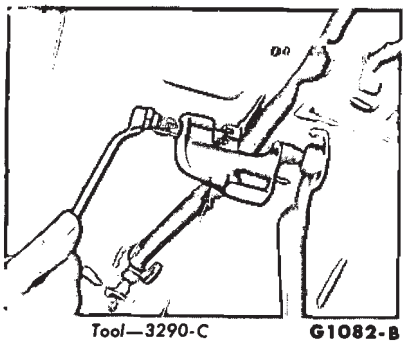

FIG. 6—Removing Ball Stud—Typical

from the spindle arm center link using the tool shown in Fig. 6.

3. Remove the end assembly from the sleeve. Discard all end assembly parts that were removed from the sleeve. **All new parts should be used when a spindle connecting rod end is replaced.**

4. Thread a new end into the sleeve, but do not tighten the sleeve clamp bolts at this time.

5. Install the seal on the rod end ball stud, insert the stud in the hole from which the old stud was removed, and install the stud nut. Torque the nut to specification and install the cotter pin.

6. Check and, if necessary adjust toe-in. Loosen the clamps from the sleeve. Oil the sleeve, clamps, bolts and nuts and position clamp openings over the slots in the sleeve. Tighten the clamp nuts to specification after toe-in is adjusted.

ADJUSTING SLEEVE REMOVAL AND INSTALLATION

An adjusting sleeve should be replaced if it becomes worn or damaged (Figs. 1 through 5). **Do not attempt to straighten the sleeve if damaged.**

1. Remove the spindle connecting rod end assemblies as described in the previous sub-section.

2. Screw the spindle rod end assemblies into the new sleeve the same number of turns as the ends that were removed. Do not tighten the clamp bolts at this time.

3. Position the sleeve and end assembly on the center link and the spindle arm. Install the attaching nut, torque it to specification, and install the cotter pin.

4. Check and, if necessary, adjust toe-in (Part 14-01). Loosen the clamps from the sleeve. Oil the sleeve, clamps, bolts and nuts. Tighten the clamp nuts to specification after toe-in is adjusted. The sleeve clamp must be installed as shown in Figs. 11, Part 14-01.

CENTER LINK REMOVAL AND INSTALLATION

The center link connecting the Pitman arm and the idler arm is non-adjustable and is provided with tapered holes to accommodate the ball studs (Figs. 1 through 5). The link should be replaced when damaged or when worn at the ball studs.

REMOVAL

1. Raise the vehicle on a hoist and position safety stands.

2. Remove the cotter pins and nuts that attach both inner connecting rod ends to the center link (Figs. 1 through 5).

3. Disconnect the inner connecting rod ends from the center link using Tool 3290-C (Fig. 6).

4. Remove the cotter pin and nut attaching the idler arm to the center link.

5. Remove the cotter pin and nut attaching the Pitman arm to the center link. Disconnect the Pitman arm from the center link (use Tool 3290-C) and remove the center link. On vehicles equipped with the non-integral

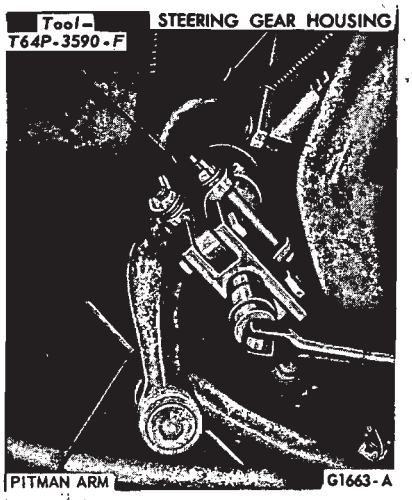

FIG. 7—Removing Pitman Arm—Typical

power steering system, remove the center link from the control valve as detailed in Part 13-05.

INSTALLATION

1. Replace the rubber seals on the spindle connecting rod ends, if required.
2. Position the center link to the Pitman arm and idler arm and install the attaching nuts loosely. Place the idler arm and the front wheels in the straight ahead position to insure keeping the steering wheel aligned and to prevent bushing damage after the attaching nuts have been torqued. Torque the nuts to the low end of the specification. Continue to tighten each nut until the slots in the nut align with the hole in the stud. Then install a new cotter pin.
3. Position the spindle connecting rod ends to the center link and install the attaching nuts. Torque the nuts to the low end of the specification. Continue to tighten each nut until the slots in the nut align with the hole in the stud. Then, install a new cotter pin.
4. Remove the safety stands, lower the vehicle, check and adjust toe-in to specification (Part 14-01).

STEERING IDLER ARM AND BRACKET ASSEMBLY REMOVAL AND INSTALLATION

REMOVAL

If the idler arm bushings are worn the complete idler arm assembly must be replaced.

1. Remove the cotter pin and nut attaching the steering center link at the idler arm (Figs. 1 through 5).
2. Remove the two bolts that attach the idler arm and bracket assembly to the frame.

INSTALLATION

1. Loosely assemble the center link to the idler arm.
2. Secure the new idler arm and bracket assembly to the frame with the two attaching bolts (nuts and flat washers as shown in Figs. 1, 2, 4 and 5).
3. Place the idler arm and the front wheels in the straight ahead position to insure keeping the steering wheel aligned and to prevent bushing damage after the attaching nut has been torqued.
4. Install the nut and washer. Torque the idler arm rod nut to specification and install a new cotter pin.

PITMAN ARM REMOVAL AND INSTALLATION

REMOVAL

1. Remove the cotter pin from the castellated nut that attaches the steering center link to the Pitman arm. Remove the castellated nut.
2. Disconnect the steering center link from the Pitman arm with tool 3290-C.
3. Remove the Pitman arm attaching nut and lock washer.
4. Position the front wheels in the straight ahead position. Remove the Pitman arm with tool T64P-3590-F (Fig. 7).

INSTALLATION

1. With the front wheels in the straight ahead position, place the Pitman arm on the sector shaft making sure it is pointing forward.
2. Install the nut and lock washer. Torque the nut to specification.
3. Secure the steering center link to the Pitman arm with the castellated nut. Torque the nut to specification and install the cotter pin. **Always tighten the nut to the next castellation if necessary to install the cotter pin.**

3 SPECIFICATIONS

STEERING LINKAGE TORQUE LIMITS (FT–LBS)

Description		Cougar, Fairlane, Falcon, Montego, Mustang, Maverick	Other Car Lines
Cylinder Mounting Bracket to Underbody or Frame	(Side Hole)	28-35	
	(Bottom Hole)	40-48	
Power Cylinder to Bracket		18-24	
Power Cylinder to Bracket Lock Nut		3-5	
Steering Tie Rod End to Spindle Arm		35-47 ①	35-47 ①
Idler Arm Mounting Bracket to Underbody or Frame		30-40	28-35
Pitman Arm to Control Valve (Power Steering)		35-47 ①	
Steering Gear to Side Rail or Frame		50-65	50-65
Pitman Arm to Sector Shaft		150-225	150-225
Idler Arm to Pitman Arm-to-Idler Arm Rod		50-70 ①	50-70 ①
Spindle Connecting Rod Clamp to Adjusting Sleeve		9-15	8-14 (Lincoln 9-15)
Pitman Arm to Steering Arm-to-Idler Arm Rod		35-47 ①	35-47 ①
Steering Spindle Arm Connecting Rod to Arm-to-Idler Arm Rod		35-47 ①	35-47 ①

①Torque to low limit of specification; then, tighten the nut to the nearest cotter pin slot and insert the cotter pin.

CG1717-A

SPECIAL SERVICE TOOLS

Tool No.	Description
3290-C	Tie Rod Ball Ends and Control Valve Ball Stud Remover
T64P-3590-F	Steering Pitman Arm Remover

CG1718-A

PART 13-04 *Manual Steering*

COMPONENT INDEX Applies Only To Models Indicated	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Maverick	Montego	Mustang
STEERING GEAR										
Description		04-01	04-01	04-01	04-01	04-01	04-01	04-01	04-01	04-01
Disassembly and Assembly		04-03	04-03	04-03	04-03	04-03	04-03	04-03	04-03	04-03
Lubricant Checking Procedure (See Part 13-01) Removal and Installation		04-02	04-02	04-02	04-02	04-02	04-02	04-02	04-02	04-02
STEERING WORM AND SECTOR Adjustment		04-02	04-02	04-02	04-02	04-02	04-02	04-02	04-02	04-02

A page number indicates that the item is for the vehicle(s) listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle(s) listed.

1 DESCRIPTION

STEERING GEAR

The steering gear (Fig. 1) is of the worm and recirculating ball type. The sector shaft is straddle mounted having a bushing located in the cover above the gear and a roller bearing in the housing below the gear.

The worm bearing preload is controlled by the large adjusting nut which is threaded into the housing. The sector shaft mesh load is controlled by an adjusting screw located in the housing cover.

The steering linkage consists of the Pitman arm, steering-arm-to-idler arm rod, idler arm and the spindle connecting rods (tie rods).

A steering gear identification tag is provided under one of the cover attaching bolts (Fig. 2).

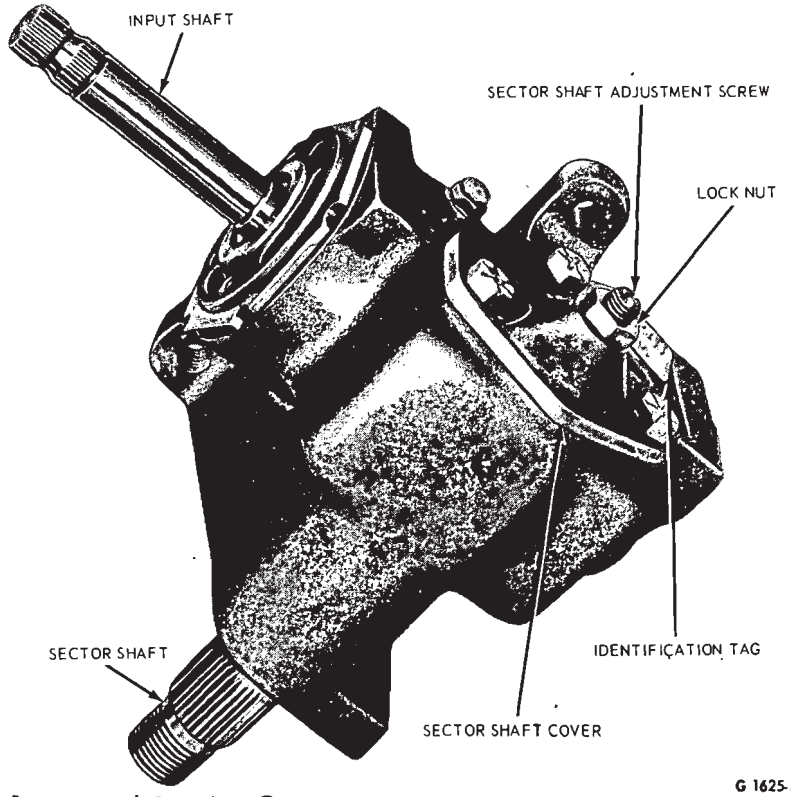

FIG. 1—Manual Steering Gear

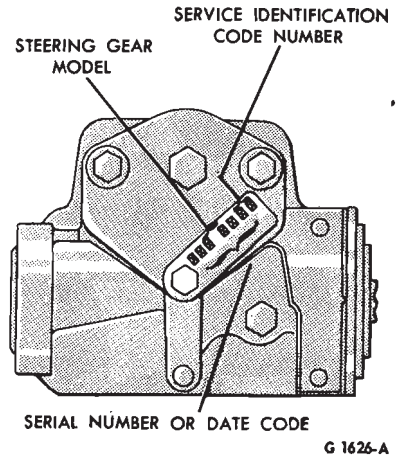

FIG. 2—Steering Gear Identification

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

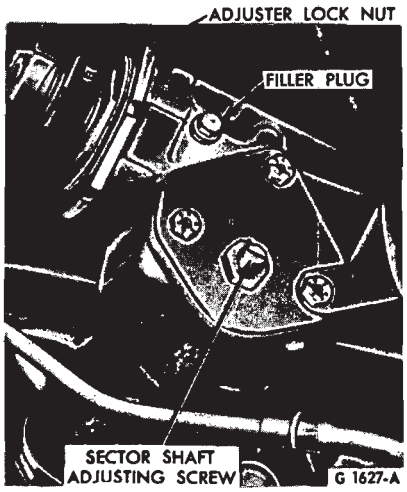

FIG. 3—Steering Gear Adjustments—Typical

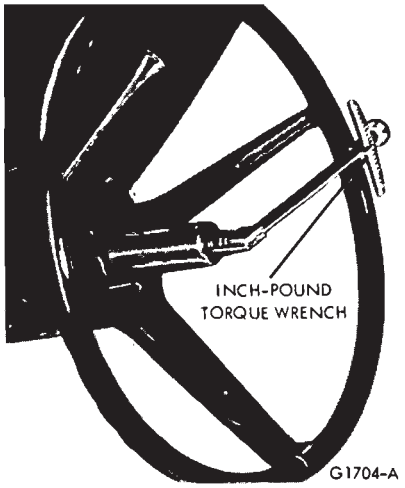

FIG. 4—Checking Steering Gear Preload—Typical

STEERING WORM AND SECTOR

GEAR ADJUSTMENTS

The ball nut assembly and the sector gear must be adjusted properly to maintain minimum steering shaft end play (a factor of preload adjustment) and minimum backlash between sector gear and ball nut. There are only two possible adjustments within the recirculating ball-type steering gear, and these should be made in the following order to avoid damage or gear failure.

1. Disconnect the Pitman arm from the steering Pitman-to-idler arm rod.
2. Loosen the nut which locks the sector adjusting screw (Fig. 3), and turn the adjusting screw counterclockwise. (On models equipped with the Cobra Jet engine, it may be necessary to use a suitable holding tool with an extension and a long screwdriver to make the gear adjustment).
3. Measure the worm bearing preload by attaching an in-lb torque wrench to the steering wheel nut (Fig. 4). With the steering wheel off center, read the pull required to rotate the input shaft approximately 1 1/2 turns either side of center. If the torque or preload is not within specification, adjust as explained in the next step.
4. Loosen the steering shaft bearing adjuster lock nut, and tighten or back off the bearing adjuster (Fig. 1) to bring the preload within the specified limits.
5. Tighten the steering shaft bearing adjuster lock nut, and recheck the preload.
6. Turn the steering wheel slowly to either stop. **Turn gently against the stop to avoid possible damage to the ball return guides. Then rotate the wheel 2-3/4 turns to center the ball nut.**
7. Turn the sector adjusting screw clockwise until the specified torque is necessary to rotate the worm past its center (high spot) (Fig. 1).
8. While holding the sector adjusting screw, tighten the sector adjusting screw locknut to specification, and recheck the backlash adjustment.
9. Connect the Pitman arm to the steering arm-to-idler arm rod.

3 REMOVAL AND INSTALLATION

STEERING GEAR

REMOVAL

1. Remove the bolt(s) that retains the flex coupling to the steering shaft.
2. Remove the nut and lock washer that secures the Pitman arm to the sector shaft using Tool T64P-3590-F (Fig. 5).
3. To obtain clearance on some models equipped with standard transmission, it may be necessary to disconnect the clutch linkage. On some 8-cylinder models, it may be necessary to lower the exhaust system.
4. Remove the steering gear-to-side rail bolts and remove the gear.

INSTALLATION

1. Position the steering gear and flex coupling in place; then, install and torque the steering gear-to-side rail bolts to specification (50-65 ft-lb).
2. If the clutch linkage has been disconnected, reposition, install and adjust it. If the exhaust system has been lowered, reinstall it to its proper position.
3. Position the Pitman arm and the sector shaft and install the attaching nut and lock washer. Torque the nut to 150-225 ft-lb.
4. Install and connect the flex coupling attaching nut(s) and torque it to specification. See Steering Column Installation, Part 13-02.

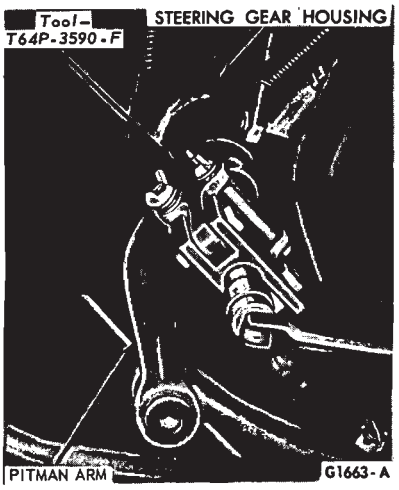

FIG. 5—Removing Pitman Arm

4. MAJOR REPAIR OPERATIONS

STEERING GEAR

DISASSEMBLY

1. Rotate the steering shaft 3 turns from either stop.

2. After removing the sector adjusting screw locknut and the housing cover bolts (Fig. 6), remove the sector shaft with the cover. Remove the cover from the shaft by turning the screw clockwise. **Keep the shim with the screw.**

3. Loosen the worm bearing adjuster nut, and remove the adjuster assembly and the steering shaft upper bearing (Fig. 7).

4. Carefully pull the steering shaft and ball nut from the housing, and remove the steering shaft lower bearing. **To avoid possible damage to the ball return guides, keep the ball nut from running down to either end of the worm.**

Disassemble the ball only if there is indication of binding or tightness.

5. Remove the ball return guide clamp and the ball return guides from the ball nut. **Keep the ball nut clamp side up until ready to remove the balls.**

6. Turn the ball nut over, and rotate the worm shaft from side to side until all 50 balls have dropped out of the nut into a clean pan. With the balls removed, the ball nut will slide off the worm.

7. Remove the upper bearing cup from the bearing adjuster and the lower cup from the housing. It may be necessary to tap the housing or the adjuster on a block of wood to jar the bearing cups loose.

8. If the preliminary inspection shows damage, press the sector shaft bearing and the oil seal from the housing (Fig. 8).

ASSEMBLY

1. If the sector shaft bearing and oil seal have been removed, press a new bearing into the housing and install a new oil seal. Do not clean, wash or soak seals in cleaning solvent (Fig. 7). **Apply the recommended steering gear lubricant to the bearing and seals.**

2. Install a bearing cup in the lower end of the housing and in the adjuster.

3. If the seal in the bearing adjuster was removed, install a new seal.

4. Insert the ball guides into the holes of the ball nut, tapping them lightly with a wood handle of a screw driver if necessary to seat them.

5. Insert 25 balls into the hole in the top of each ball guide. It may be necessary to rotate the shaft slightly one way, then in the opposite direction to distribute the balls in the circuit.

6. After the 50 balls are installed, install the ball guide clamp. Torque the screws to specification. Check the worm shaft to make sure that it rotates freely.

7. Coat the threads of the steering shaft bearing adjuster, the housing cover bolts, and the sector adjusting screw with a suitable oil-resistant sealing compound. **Do not apply sealer to female threads and especially avoid getting any sealer on the steering shaft bearings.**

8. Coat the worm bearings, sector shaft bearings, and gear teeth with steering gear lubricant.

9. Clamp the housing in a vise, with the sector shaft axis horizontal, and position the steering shaft lower bearing in its cup.

10. Position the steering shaft and ball nut assemblies in the housing.

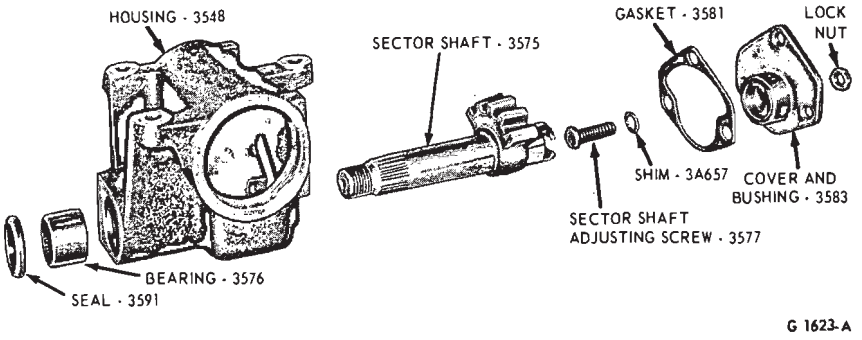

FIG. 6—Sector Shaft and Housing Disassembled

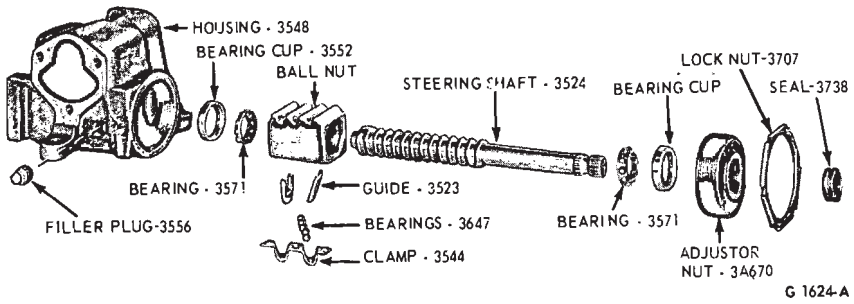

FIG. 7—Steering Shaft and Related Parts Disassembled

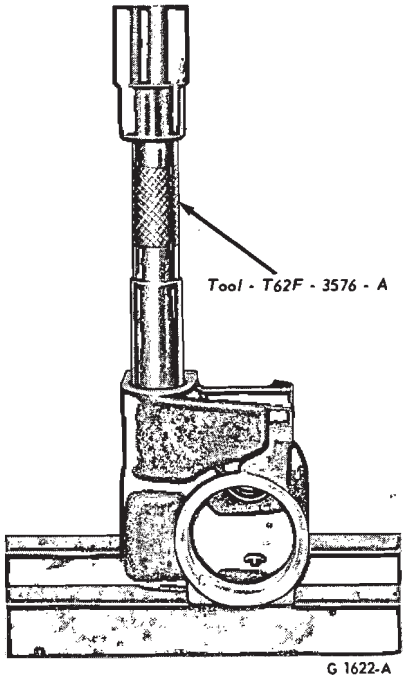

FIG. 8—Removing Oil Seal and Bearing

11. Position the steering shaft upper bearing on the top of the

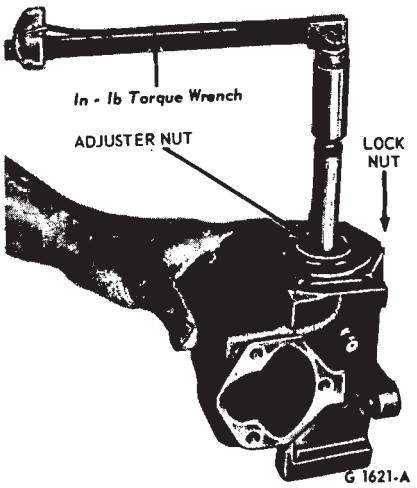

FIG. 9—Checking Steering Shaft Bearing Preload

worm, and install the steering shaft bearing adjuster and the adjuster nut and bearing cup. Leave the nut loose.

12. Adjust the worm bearing preload, using an in-lb torque wrench (Fig. 9). See the Specifications section for the specified preload.

13. Position the sector adjusting screw and adjuster shim, and check the end clearance which should not exceed 0.002 inch between the screw head and the end of the sector shaft. If clearance is greater than 0.002 inch, add enough shims to reduce the end play to within the 0.002 inch tolerance.

14. Start the sector shaft adjusting screw into the housing cover.

15. Install a new gasket on the housing cover.

16. Rotate the steering shaft until the ball nut teeth are in position to mesh with the sector gear, tilting the housing so that the ball will tip toward the housing cover opening.

17. Lubricate the sector shaft journal and install the sector shaft and cover.

18. With the housing cover turned out of the way fill the gear with the specified amount of gear lubricant. Push the housing cover and sector shaft assemblies into place, and install the two top housing cover bolts. **Do not tighten the cover bolts until it is certain that there is some lash between ball nut and sector gear teeth.** Hold or push the cover away from the ball nut, then torque the bolts to specification.

19. After loosely installing the sector shaft adjusting screw lock nut, adjust the sector shaft mesh load. See the Specifications section for the specified mesh load; then, tighten the adjusting screw lock nut.

5 SPECIFICATIONS

MANUAL STEERING GEAR SPECIFICATIONS

Vehicle	Ford, Mercury, Meteor	Mustang, Cougar			Falcon, Montego, Fairlane
Model	**SMA-D-1**	**SMB-D**	**SMB-K②**	**SMB-F①**	**SMA-F**
Gear Ratio	24:1	19.9:1	16:1	16:1	22:1
Turns of Strg. Gr. (Lock to Lock)③	6-2/5	4-5/8	3-3/4	3-3/4	5-1/2
Lube Type	ESW–M1C87–A				
Lube Capacity (Lb.)	.97 ± .07	.55 ± .05	.55 ± .05	.55 ± .05	.87 ± .07
Worm Bearing Preload (In Lb)④	4-5	4-5	3-4②	4-5	4-5
Total Center Meshload (In Lb)⑤	9-10	9-10	8-9②	9-10	9-10
Adjustments (All Models)	Adjusting screw to bottom of sector shaft T slot clearance: .000–.002				

①Production only – for service, use Model SMB-K.
②When used for improved or competition handling, worm bearing preload must be adjusted to 4-5 In Lb and total center meshload must be adjusted to 9-10 In Lb.
③Gear only – not attached to Pitman arm.
④Torque required to rotate input shaft at approximately 1-1/2 turns either side of center (gear out of vehicle or Pitman arm disconnected).
⑤Required to rotate input shaft and worm assembly past the center high point.

CG1719-A

MANUAL STEERING GEAR TORQUE LIMITS (FT-LB)

Description	Ford, Mercury, Meteor	Fairlane, Falcon, Montego, Maverick	Mustang Cougar
Sector Shaft Cover Bolts	30-40	17-25	15-22
Mesh Load Adjusting Screw Lock Nut	32-40	32-40	32-40
Ball Return Guide Clamp Screw	18-42 (In-Lb)	42-60 (In-Lb) Man.	18-42 (In-Lb)
Preload Adjuster Lock Nut	60-80	60-80	45-60
Lubricant Fill Plug and Vent	3-9①	3-9①	3-9①

①Minimum of one thread must remain exposed when installed.

CG1720-A

SPECIAL SERVICE TOOLS

Tool No.	Description
T64P-3590-F	Steering Pitman Arm Remover
T62F-3576-A	Sector Shaft Bushing Remover and Replacer

CG1721-A

PART 13-05 *Ford Design Non-Integral Power Steering System*

COMPONENT INDEX Applies Only To Models Indicated	Cougar	Fairlane	Falcon	Maverick	Montego	Mustang
CONTROL VALVE Disassembly, Overhaul, Assembly	05-04	05-04	05-04	05-04	05-04	05-04
Removal and Installation	05-03	05-03	05-03	05-03	05-03	05-03
CONTROL VALVE CENTERING SPRING Adjustment	05-02	05-02	05-02	05-02	05-02	05-02
CONTROL VALVE TO POWER STEERING CYLINDER HOSE Removal and Installation	05-02	05-02	05-02	05-02	05-02	05-02
HOISTING INSTRUCTIONS	05-01	05-01	05-01	05-01	05-01	05-01
POWER CYLINDER Removal and Installation	05-03	05-03	05-03	05-03	05-03	05-03
POWER CYLINDER SEAL Removal and Installation	05-06	05-06	05-06	05-06	05-06	05-06
POWER STEERING PUMP TO CONTROL VALVE HOSE Removal and Installation	05-02	05-02	05-02	05-02	05-02	05-02
POWER STEERING SYSTEM Description	05-01	05-01	05-01	05-01	05-01	05-01

A page number indicates that the item is for the vehicle(s) listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle(s) listed.

1 DESCRIPTION

The Ford Non-Integral Power Steering System (Fig. 1) is a hydraulically controlled linkage-type steering system which includes an integral pump and fluid reservoir, a control valve, a power cylinder, the connecting fluid lines, and the steering linkage. The hydraulic pump and belt, driven from the engine crankshaft, draws fluid from the reservoir and provides fluid pressure for the system. Within the pump itself is a pressure-relief valve which governs the pressures within the steering system according to the varying conditions of operation. After fluid has passed from the pump to the control valve and the power cylinder, it returns to the reservoir.

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

HOISTING INSTRUCTIONS

Damage to suspension and/or steering linkage components may occur if care is not exercised when positioning the hoist adapters of 2 post hoists prior to lifting the vehicle.

If a 2 post hoist is used to lift the vehicle, place the adapters under the

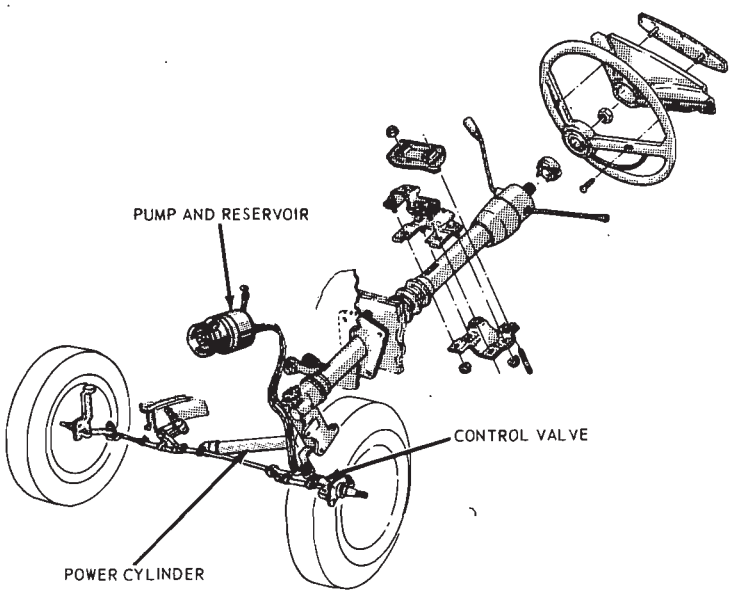

FIG. 1—Non-Integral Power Steering System

front suspension lower arms. **Do not allow the adapters to contact the steering linkage.**

CONTROL VALVE CENTERING SPRING ADJUSTMENT

1. Raise the vehicle and remove 2 spring cap attaching screws and lock washers and remove the spring cap.
2. Tighten the adjusting nut snug (90-100 in-lbs); then, loosen the nut 1/4 turn. Make sure that the nut rotates 1/4 turn (90 degrees) on the threads of the bolt. Do not tighten the adjusting nut too tight.
3. Position the spring cap to the valve housing. Lubricate and install the two attaching screws and washers. Torque the screws to 72-100 in-lbs.
4. Lower the vehicle.
5. Start the engine and check the turning effort with a spring scale. With the spring scale attached to the rim of the steering wheel, the effort to turn the wheel in both directions should not exceed 6.5 pounds.

CONTROL VALVE TO POWER STEERING CYLINDER HOSE

1. Raise the vehicle on a hoist and place a drain pan under the power cylinder.
2. Disconnect the hose from the power cylinder and allow the fluid to drain from the hose. Then, disconnect the hose from the control valve.
3. Connect the unmarked end of the shorter tube (9 7/16 in long) to valve port C (Fig. 2). Hold the tube so that the bend parallels the surface of valve shown in Fig. 2 and tighten the nut. Connect the opposite end to the lower port in the cylinder. Hold the tube securely while tightening the nut to prevent twisting the tube. Connect the other tube (9 5/8 in long) to port A, making sure that tube is parallel with the other tube.
4. Remove the drain pan and lower the vehicle.
5. Fill the power steering pump reservoir with fluid to the proper level (Part 13-01).
6. Start the engine and turn the steering wheel to each end of its travel several times to cycle the system. Then, check for leaks.
7. Stop the engine and again check the power steering fluid level. Add fluid as required.

POWER STEERING PUMP TO CONTROL VALVE HOSE

REMOVAL

1. Remove the fluid from the pump reservoir with a suction gun.
2. Raise the vehicle on a hoist.
3. Remove the clamp retaining the hose tubes to the control valve.
4. Disconnect the fluid return and pressure hoses from the control valve and allow the fluid to drain into a pan.
5. Lower the vehicle and disconnect the fluid return hose from the reservoir.
6. Disconnect the fluid pressure hose from the pump outlet fitting.
7. Remove 1 bolt attaching the hoses, insulator, and the retainer to the frame side rail and remove the hoses, and the insulator and retainer as an assembly from the vehicle.
8. Remove the pressure and return hoses from the retainer and insulator.

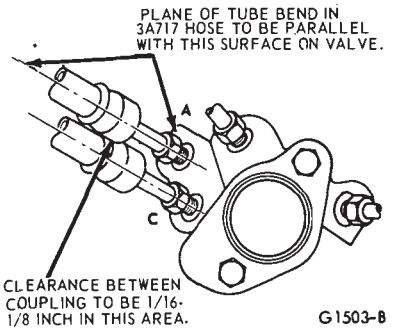

FIG. 2—Power Steering Hose Installation

INSTALLATION

1. Install the pressure and return hoses in the insulator and retainer. Paint stripe on pressure hose must be aligned with slot in insulator. Paint or tape band on return hose must be centered in insulator. Position the assembly to the frame side rail and install the attaching bolt.
2. Place a hose clamp on the fluid return hose and install the hose on the power steering pump reservoir return fitting.
3. Torque the pump outlet fitting to specification. Then, connect the pressure hose to the outlet fitting and torque the fitting to specification.
4. Raise the vehcile and connect the pressure and return lines to the control valve.
5. Install the clamp to retain the hose tubes to the control valve.
6. Lower the vehicle and fill the power steering pump reservoir with fluid. C1AZ-19582-A, to the proper level (Part 13-01).
7. Start the engine and turn the steering wheel to each end of its travel several times to cycle the system. Then, check for fluid leaks.
8. Stop the engine and again check the power steering fluid level (Part 13-01). Add fluid as required.

3 REMOVAL AND INSTALLATION

HOISTING INSTRUCTIONS

Damage to suspension and/or steering linkage components may occur if care is not exercised when positioning the hoist adapters of 2 post hoists prior to lifting the vehicle.

If a 2 post hoist is used to lift the vehicle, place the adapters under the front suspension lower arms. **Do not allow the adapters to contact the steering linkage.**

STEERING GEAR

Refer to Group 13-04, Section 3 for detailed instructions.

POWER STEERING PUMP

Refer to Group 13-07, Section 3 for detailed instructions.

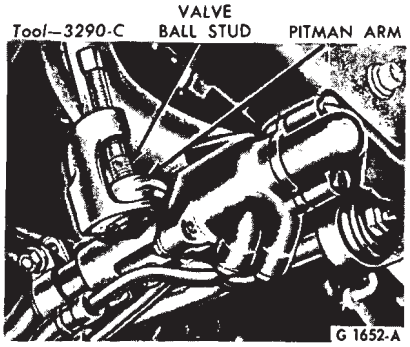

FIG. 3—Removing Control Valve Ball Stud

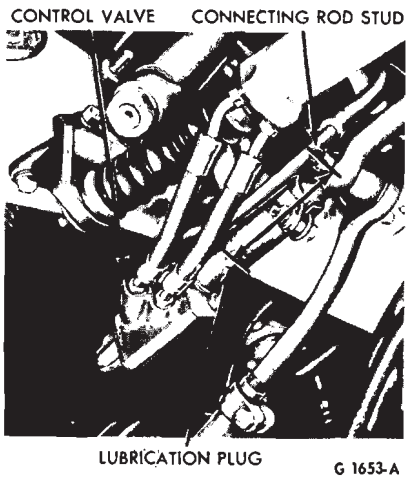

FIG. 4—Control Valve Installation Measurements—All Models

POWER STEERING CONTROL VALVE

REMOVAL

1. Disconnect the 4 fluid line fittings at the control valve, and drain the fluid from the lines. Turn the front wheels to the left and right several times to force all the fluid from the system.
2. Loosen the clamping nut and bolt at the right end of the sleeve.
3. Remove the roll pin from the steering arm-to-idler arm rod through the slot in the sleeve.
4. Remove the control valve ball stud nut.
5. Using the tool shown in Fig. 3, remove the ball stud from the sector shaft arm.
6. After turning the front wheels fully to the left, unthread the control valve from the center link steering arm-to-idler arm rod.

INSTALLATION

1. Thread the valve onto the center link until about four threads are still visible on the link.
2. Position the ball stud in the sector shaft arm.
3. Measure the distance between the center of the grease plug in the sleeve and the center of the stud at the inner end of the left spindle connecting rod (Fig. 4). The distance should be 5 5/8 inches for Montego, Falcon, Maverick and Fairlane vehicles. The distance should be 4 7/8 inches for Mustang and Cougar models. If the distance is not correct, disconnect the ball stud from the sector shaft arm and turn the valve on the center link to increase or decrease the distance.
4. When the correct distance is obtained and the ball stud is positioned in the sector shaft arm, align the hole in the steering arm-to-idler arm rod with the slot near the end of the valve sleeve. Install the roll pin in the rod hole to lock the valve in position on the rod.
5. Torque the valve sleeve clamp bolt to specification.
6. Install the nut on the ball stud, and torque the nut to specification. Install a new cotter pin.
7. Connect the fluid lines to the control valve, and tighten all fittings securely. **Do not over-tighten.**
8. Fill the fluid reservoir with the specified fluid to the cross hatched area on the dip stick.
9. Start the engine and run it at idle speed for about two minutes to warm the fluid in the power steering system.
10. Turn the steering wheel all the way to the left and right several times, and check the system for fluid leaks.
11. Increase the engine speed to about 1000 rpm, and turn the steering wheel all the way to the left and right several times.
12. Stop the engine, and check the control valve and hose connections for fluid leaks. Correct the cause of any leaks.
13. Check the fluid level, and refill the reservoir if necessary.
14. With the engine running check the position of the steering wheel when the front wheels are in the straight-ahead position. **Do not make any adjustments until toe-in is checked.**
15. Keep the engine running, and check toe-in. If either toe-in or steering wheel position is not correct make all necessary adjustments (Part 14-01) at the spindle connecting rod sleeves.
16. Check the effort to turn the wheels in both directions. The effort should be about equal in both directions.

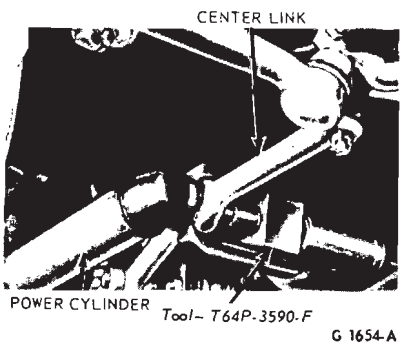

FIG. 5—Disconnecting Power Cylinder Stud

POWER CYLINDER

REMOVAL

1. Disconnect the two fluid lines from the power cylinder and allow them to drain into a container.
2. Remove the pal nut, attaching nut, washer and the insulator from

the end of the power cylinder rod.

3. Remove the cotter pin and castellated nut that secures the power cylinder stud to the center link.

4. Disconnect the power cylinder stud from the center link as shown in Fig. 5.

5. Remove the insulator sleeve and washer from the end of the power cylinder rod.

6. Inspect the tube fittings and the seats in the power cylinder for nicks, burrs or damage. Replace the seats in the cylinder or the tubes as required.

INSTALLATION

1. Install the washer, sleeve and the insulator on the end of the power cylinder rod.

2. Extend the rod as far as possible. Insert the rod in the bracket on the frame and compress the rod as necessary to insert the stud in the center link. Secure the stud with a castellated nut and a cotter pin.

3. Secure the power cylinder rod with an insulator, washer, nut and a pal nut.

4. Connect each of the two fluid lines to its respective port in the cylinder.

5. Fill the reservoir to the correct level.

6. Start the engine and turn the steering wheel to each end of its travel several times to cycle the system. Stop the engine.

7. Check the fluid level and fill as necessary. Install the dipstick and cap.

8. Start the engine and check for leaks.

4 MAJOR REPAIR OPERATIONS

CONTROL VALVE

DISASSEMBLY

1. Wipe all fluid and loose dirt from the outside of the control valve.

2. Remove the centering spring cap from the valve housing (Fig. 6).

When holding the control valve for disassembly, use a soft-jawed vise, and clamp the valve only around the sleeve flange to prevent damage to the housing, spool, or sleeve.

3. Remove the nut from the end of the valve spool bolt. Remove the washers, spacer, centering spring, adapter, and bushing from the bolt and the valve housing.

4. Remove the two bolts that hold the valve housing and the sleeve together, and separate the housing from the sleeve.

5. Remove the plug from the valve sleeve.

6. Push the valve spool out of the centering spring end of the valve housing, and remove the seal from the spool.

7. Remove the spacer, bushing, and seal from the sleeve end of the valve housing.

8. Drive the stop pin out of the travel regulator stop with a punch and hammer (Fig. 7). **Pull the head of the valve spool bolt tightly against the travel regulator stop before driving the pin out of the stop.**

9. Turn the travel regulator stop counterclockwise in the valve sleeve to remove the stop from the sleeve.

10. Remove the valve spool bolt, spacer, and rubber washer from the travel regulator stop.

11. Remove the rubber boot and clamp from the valve sleeve.

12. Slide the bumper, spring, and ball stud seat out of the valve sleeve, and remove the ball stud socket from the sleeve.

13. After removing the return port hose seat, remove the return port relief valve.

14. After removing the spring plug and O-ring, remove the reaction limiting valve (Fig. 8).

Tube Seat Replacement

If a hose seat is worn or damaged it should be replaced. It can be removed with an Easy-Out tool, or by using a bolt of appropriate size as a puller.

1. Tap the existing hole in the hose seat, using a starting tap of suitable size. **Be sure to remove all metal chips from the hose seat port after tapping.**

2. Place a nut and large flat washer on a bolt of the same size as the tapped hole. The washer must be large enough to cover the hose seat port.

3. Insert the bolt in the tapped hole, and using the nut as a puller, remove the hose seat.

4. Place a new hose seat in the port, and thread a bolt of suitable size into the port. Tighten the bolt enough to bottom the seat in the port.

ASSEMBLY

Before assembling the control valve, coat all parts except the seals with Automatic Transmission Fluid. Coat the seals with lubricant COAZ-19553-A.

1. Install the reaction limiting valve, the spring, and the plug.

2. Install the return port relief valve and the hose seat.

3. Insert one of the ball stud seats (flat end first) into the ball stud socket, and insert the threaded end of the ball stud into the socket.

4. Place the socket in the control valve sleeve so that the threaded end of the ball stud can be pulled out through the slot in the sleeve (Fig. 9).

5. Place the other ball stud seat, and spring, and the bumper (Fig. 6) in the socket, and install and securely tighten the travel regulator stop.

6. Loosen the stop just enough to align the nearest hole in the stop with the slot in the ball stud socket, and install the stop pin in the ball stud socket, travel regulator stop, and valve spool bolt (Fig. 7).

7. Install the rubber boot, clamp, and the plug on the control valve sleeve **Make sure that the lubrication fitting is turned on tightly and does not bind on the ball stud socket.**

8. Insert the valve spool in the valve housing. **Rotate the spool while inserting it in the housing (Fig. 10).**

9. Move the spool toward the centering spring end of the housing, and place the small seal bushing, and spacer in the sleeve end of the housing.

10. Press the valve spool against the inner lip of the seal and, at the same time, guide the lip of the seal over the spool with a small screwdriver. **Do not nick or scratch the seal or the spool during installation.**

11. Place the sleeve end of the housing on a flat surface so that the seal, bushing, and spacer are at the bottom end and push down the valve

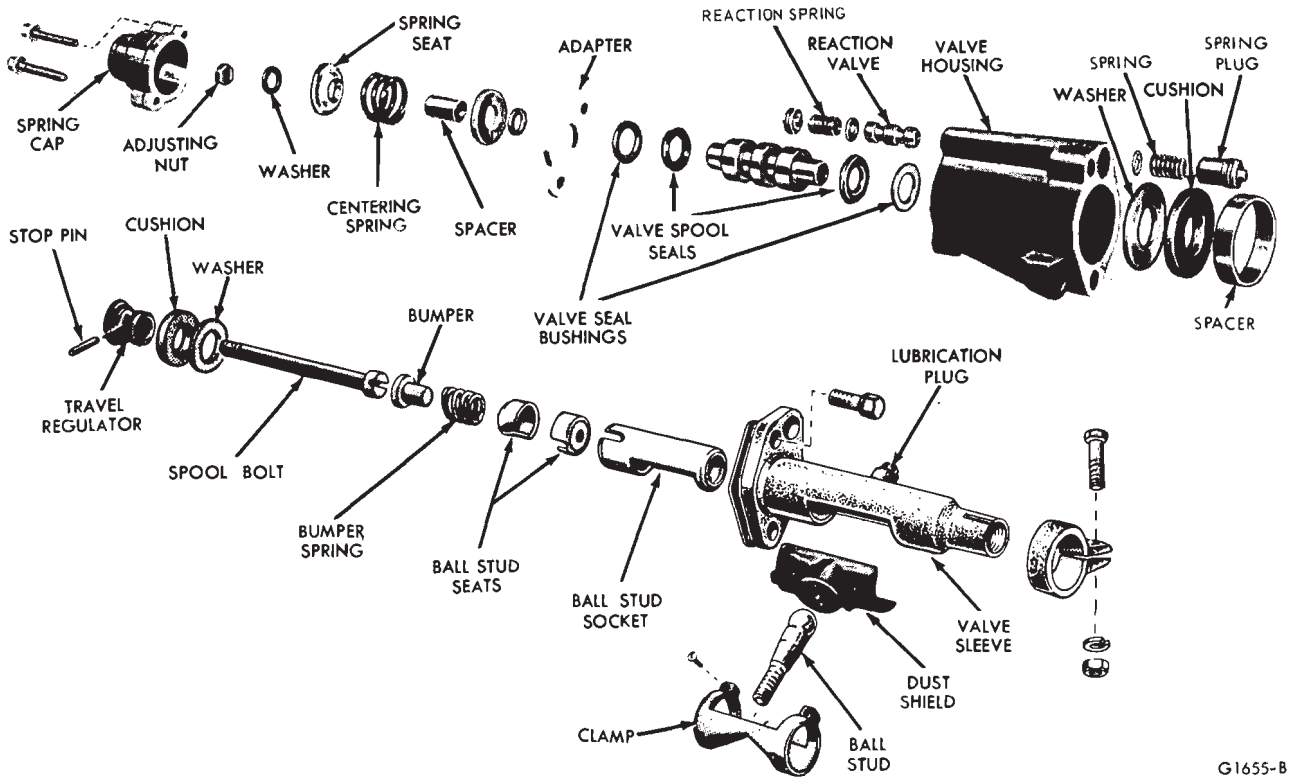

FIG. 6—Control Valve Disassembled—Typical

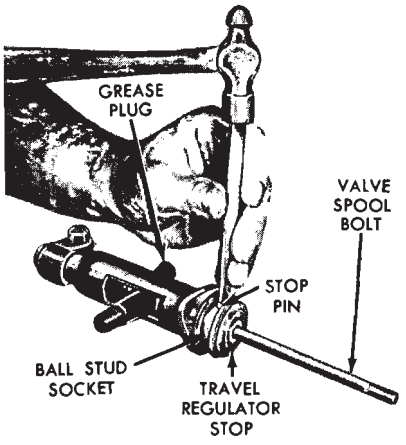

FIG. 7—Removing Stop Pin

spool until it stops.

12. Carefully install the spool seal and bushing in the centering spring end of the housing. Press the seal against the end of the spool, guiding the seal over the spool with a small screwdriver. **Do not nick or scratch the seal or the spool during installation.**

13. Pick up the housing, and slide the spool back and forth in the housing to check for free movement.

14. Place the valve sleeve on the

FIG. 8—Removing Reaction Valve Plug

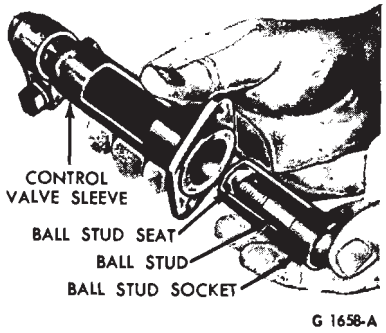

FIG. 9—Installing Ball Socket, Seal and Bracket

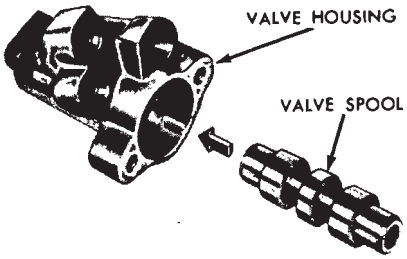

FIG. 10—Inserting Valve Spool

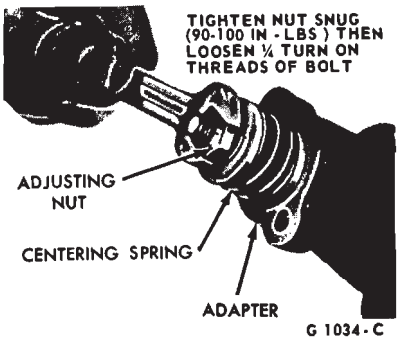

FIG. 11—Adjusting Centering Spring

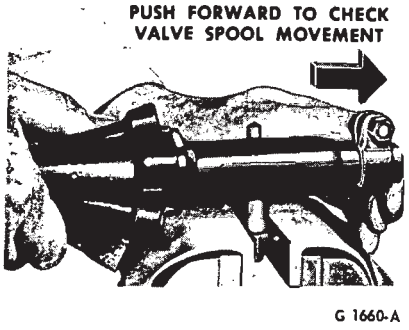

FIG. 12—Inspecting Valve Spool Movement

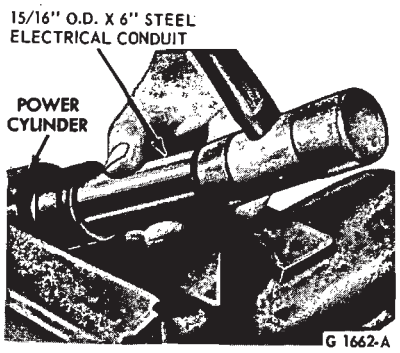

FIG. 14—Installing Power Cylinder Seals

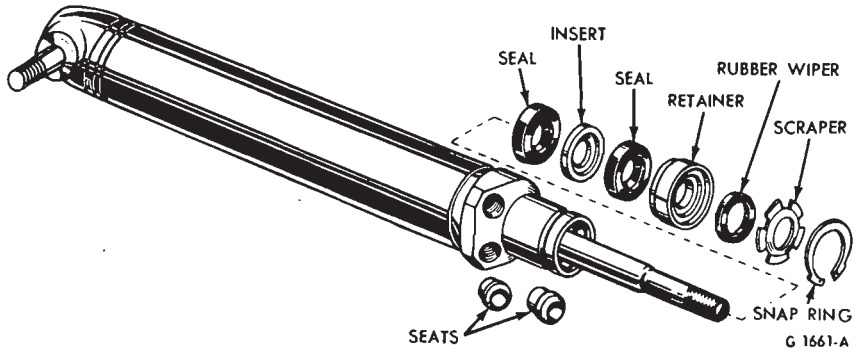

FIG. 13—Power Cylinder

housing so that the ball stud is on the same side of the housing as the ports for the two power cylinder lines. Install the two bolts in the sleeve, and torque them to specifications.

15. Place the adapter on the centering spring end of the housing, and install the bushing, washers, spacers, and centering spring on the valve spool bolt.

16. Compress the centering spring, and install the nut on the bolt. Tighten the nut snug (90-100 in-lbs); then loosen it not more than 1/4 turn (Fig. 11). Make sure that the nut turns (90 degrees) on the threads of bolt. **Excessive tightening of the nut may break the stop pin at the travel regulator stop.**

17. Move the ball stud back and forth in the sleeve slot to check the spool for free movement. Apply COAZ-19553-A (silicone) grease at the sealing areas.

18. Lubricate the two cap attaching bolts. Install the centering spring cap on the valve housing, and torque the two cap bolts to specification.

19. Install the nut on the ball stud so that the valve can be positioned in a vise as shown in Fig. 12. Then push forward on the cap end of the valve to check the valve spool for free movement.

20. Turn the valve around in the vise, and push forward on the sleeve end to check the spool for free movement.

POWER CYLINDER SEAL

REMOVAL

1. Clamp the power cylinder in a vise, and remove the snap ring from the end of the cylinder. **Be careful not to distort or crack the cylinder in the vise.**

2. Pull the piston rod out all the way to remove the scraper, bushing, and seals. If the seals cannot be removed in this manner, remove them from the cylinder with a sharp pick. Take care, when using a pick, not to damage the shaft or seal seat.

INSTALLATION

When replacing the power cylinder seals, install all of the parts supplied in the repair kit for the cylinder being repaired.

1. Coat the new seals with lubricant COAZ-19553-A and place the parts (Fig. 13) on the piston rod which has been coated with the same grease.

2. Push the rod in all the way, and install the parts in the cylinder with a deep socket slightly smaller than the cylinder opening (Fig. 14).

POWER STEERING PUMP RESERVOIR REPLACEMENT

Refer to Part 13-07, Section 3 for detailed instructions.

5 SPECIFICATIONS

POWER ASSIST STEERING GEAR SPECIFICATIONS

Vehicle	Mustang Cougar	Falcon, Maverick, Montego, Fairlane
Model	SMB-K①	SMA-B
Gear Ratio	16:1	
Turns of Strg. Gr. (Lock to Lock) ②	3 3/4	4
Lube Type	C3AZ-19578-A	
Lube Capacity (Lb.)	.55 ± .05	.87 ± .07
Warm Bearing Preload (In. Lb) ③	3-4	
Total Center Meshload (In. Lb) ④	8-9	
Adjustment	Adjusting screw to bottom of sector shaft T slot clearance: .000-.002	

①When used for improved or competition handling, worm bearing preload must be adjusted to 4-5 In Lb and total center meshload must be adjusted to 9-10 In Lb.

②Gear only - not attached to Pitman arm.

③Torque required to rotate input shaft at approximately 1-1/2 turns either side of center (gear out of vehicle or Pitman arm disconnected).

④Required to rotate input shaft and worm assembly past the center high point.

CG1722-A

POWER ASSIST STEERING GEAR TORQUE LIMITS (FT–LB)

Description	Fairlane, Falcon, Montego, Maverick	Mustang Cougar
Sector Shaft Cover Bolts	17-25	15-22
Mesh Load Adjusting Screw Lock Nut	32-40	32-40
Ball Return Guide Clamp Screw	18-42 (In-Lb)	18-42 (In-Lb)
Preload Adjuster Lock Nut	60-80	45-60
Lubricant Fill Plug and Vent	3-9①	3-9①

①Minimum of one thread must remain exposed when installed.

CG1723-A

SPECIAL SERVICE TOOLS

Tool No.	Description
3290-C	Tie Rod Ball Ends and Control Valve Ball Stud Remover
T64P-3590-F	Steering Pitman Arm Remover

CG1724-A

PART 13-06 *Ford Design Integral Power Steering Gear*

1 DESCRIPTION

The Ford integral power steering unit (Fig. 1) is a torsion-bar type of hydraulic assisted system. This system furnishes power to reduce the amount of turning effort required at the steering wheel. It also reduces road shock and vibrations.

The torsion bar power steering unit includes a worm and one-piece rack piston, which is meshed to the gear teeth on the steering sector shaft. The unit also includes a hydraulic valve, valve actuator, input shaft and torsion bar assembly which are mounted on the end of the worm shaft and operated by the twisting action of the torsion bar.

The torsion-bar type of power steering gear is designed with the one piece rack-piston, worm and sector shaft in one housing and the valve spool in an attaching housing (Fig. 1). This makes possible internal fluid passages between the valve and cylinder, thus eliminating all external lines and hoses, except the pressure and return hoses between the pump and gear assembly.

The power cylinder is an integral part of the gear housing. The piston is double acting, in that fluid pressure may be applied to either side of the piston.

A selective metal shim located in the valve housing of the gear is for the purpose of tailoring steering gear efforts. If efforts are not within specifications they can be changed by increasing or decreasing shim thickness as follows:

Efforts heavy to the left-Increase shim thickness.

Efforts light to the left—Decrease shim thickness.

A change of one shim size will increase or decrease steering efforts approximately 1 1/2 in-lbs.

Shims are available in the following thicknesses and are notched on the outside diameter for identification:

0.0057-0.0063 inch—0 notch
0.0077-0.0083 inch—1 notch
0.0097-0.0103 inch—2 notches
0.0117-0.0123 inch—3 notches
0.0137-0.0143 inch—4 notches

Do not use more than one shim.

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

VALVE SPOOL CENTERING CHECK

1. Install a 0-2000 psi pressure gauge Tool T56L-33610-D in the pressure line between the power steering pump outlet port and the integral steering gear inlet port.

2. **Make sure that the valve on the gauge is in the fully open position.**

3. Check the fluid level in the reservoir and fill it to proper level with the specified fluid.

4. Start the engine and cycle the steering wheel from stop-to-stop, to bring the steering lubricant up to normal operating temperature. Stop the engine and recheck the reservoir. Add fluid if necessary.

5. With the engine running at approximately 1000 rpm and the steering wheel centered, attach an inch-pound torque wrench to the steering wheel retaining nut. Apply sufficient torque to the torque wrench in each direction, either side of center, to get a gauge reading of 250 psi.

6. The torque reading should be the same in both directions when 250 psi is reached. If the difference between the readings exceeds 4 in-lbs, the steering gear must be removed and the valve centering shim removed from the valve housing and a thicker or thinner shim installed. Only one shim is to be used. If the steering effort is heavy to the left, the shim thickness should be increased. Shim thickness should be decreased if the steering effort is light to the left.

The **out of vehicle** procedure for valve centering check is the same as for the in vehicle except the torque and simultaneous pressure reading must be made at the right and left stops instead of either side of center.

STEERING GEAR ADJUSTMENTS

During the vehicle breaking-in period, it is probable that some of the factory adjustments will change. These changes in adjustment do not necessarily affect the satisfactory operation of the steering gear assembly, and therefore ordinarily do not require readjustment unless there is excessive lash or other malfunctioning.

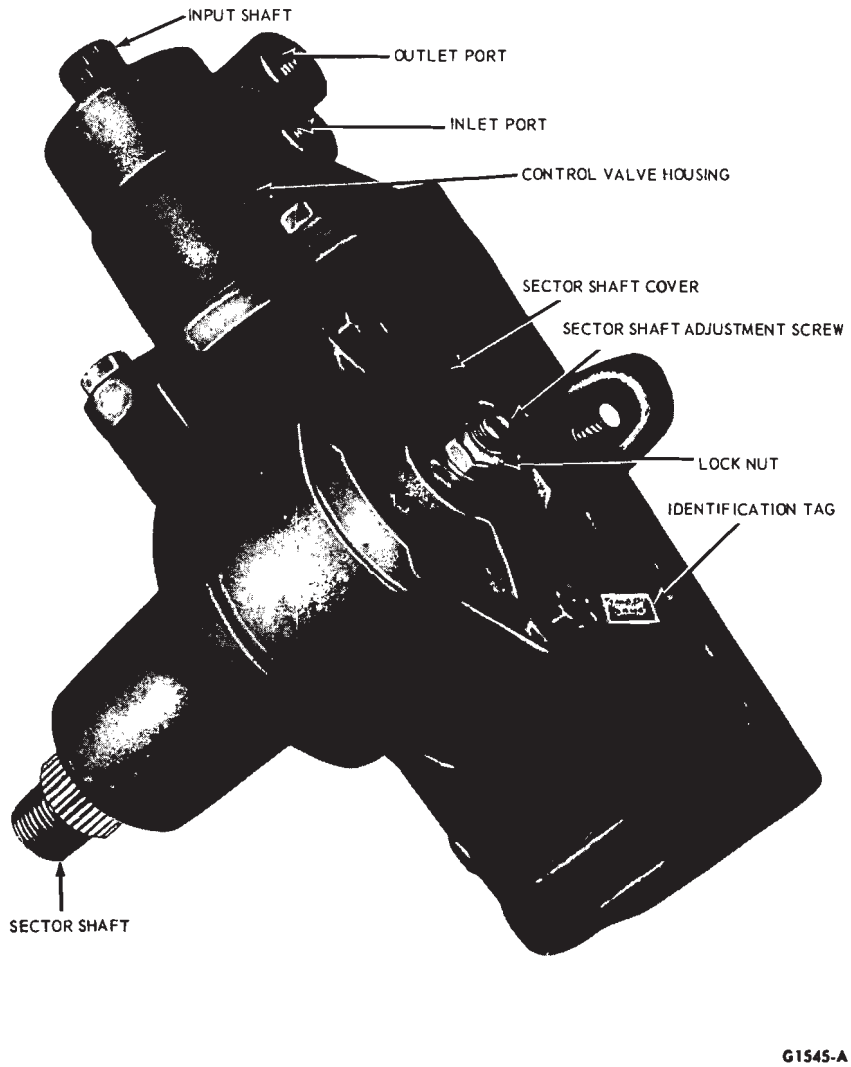

FIG. 1—Power Steering Gear

ADJUSTMENT IN VEHICLE

The only adjustment which can be performed is the total over center position load, to eliminate excessive lash between the sector and rack teeth.

1. Disconnect the pitman arm from the sector shaft.
2. Disconnect the fluid return line at the reservoir, at the same time cap the reservoir return line pipe.
3. Place the end of the return line in a clean container and cycle the steering wheel in both directions as required, to discharge the fluid from the gear.
4. Remove the ornamental cover from the steering wheel hub and turn the steering wheel to 45 degrees from the left stop.
5. Using an in-lb torque wrench on the steering wheel nut, determine the torque required to rotate the shaft slowly through an approximately 1/8 turn from the 45 degree position.
6. Turn the steering gear back to center, then determine the torque required to rotate the shaft back and forth across the center position. Loosen the adjuster nut, and turn the adjuster screw in (Fig. 2) until the reading is 8-9 in-lb greater than the torque 45 degrees from the stop.

Tighten the lock nut while holding the screw in place.

7. Recheck the readings and replace pitman arm and steering wheel hub cover.
8. Connect the fluid return line to the reservoir and fill the reservoir with specified lubricant to the proper level.

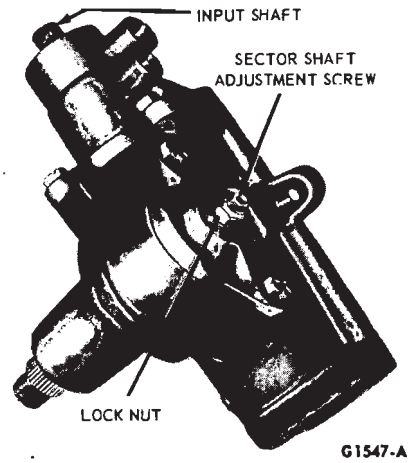

FIG. 2—Adjusting Mesh Load

3 REMOVAL AND INSTALLATION

REMOVAL

1. Disconnect the pressure and the return lines from the steering gear. Plug the lines and the ports in the gear to prevent entry of dirt.
2. Remove the two bolts that secure the flex coupling to the steering gear and to the column.
3. Raise the vehicle and remove the sector shaft attaching nut.
4. Remove the Pitman arm from the sector shaft with Tool T64P-3590-F. Remove the tool from the Pitman arm. Do not damage the seals.
5. If working on a vehicle equipped with a standard transmission, remove the clutch release lever retracting spring to provide clearance for removing the steering gear.
6. Support the steering gear; then, remove the three steering gear attaching bolts.
7. Work steering gear free of the flex coupling and remove it from the vehicle.
8. If the flex coupling stayed on the input shaft, lift it off the shaft at this time.

INSTALLATION

1. Slide the flex coupling into place on the steering shaft. Turn the steering wheel so that the spokes are in the horizontal position.
2. Center the steering gear input shaft.
3. Slide the steering gear input shaft into the flex coupling and into place on the frame side rail. Install the three attaching bolts and torque them to specification.
4. Make sure that the wheels are in the straight ahead position, then install the Pitman arm on the sector shaft. Install and tighten the sector shaft and install and tighten the attaching bolts to specification.
5. Move the flex coupling into place on the input and steering column shaft and install and tighten the attaching bolts to specification.
6. Connect and tighten the fluid pressure and return lines to the steering gear.
7. Remove the coil wire. Fill the power steering pump reservoir and, while engaging the starter, cycle the steering wheel to distribute the fluid. Check the fluid level and add fluid as required. Install the coil wire, start the engine and cycle the steering wheel. Check for fluid leaks.

4 MAJOR REPAIR OPERATIONS

In most cases, complete disassembly of the power steering gear will not be necessary. It is suggested that only those assemblies that are faulty be disassembled. Disassembly and reassembly of the unit and the subassemblies must be made on a clean work bench. As in repairing any hydraulically operated unit, cleanliness is of utmost importance. Therefore, the bench, tools, and parts must be kept clean at all times. Thoroughly clean the exterior of the unit with a suitable solvent and when necessary, drain as much of the hydraulic oil as possible. Handle all parts very carefully to avoid nicks, burrs, scratches and dirt, which could make the parts unfit for use. Do not clean, wash or soak seals in cleaning colvent.

VALVE CENTERING SHIM REMOVAL AND INSTALLATION

1. Hold the steering gear over a drain pan in an inverted position and cycle the input shaft several times to drain the remaining fluid from the gear.
2. Mount the gear in a soft-jawed vise.
3. Turn the input shaft to either stop then, turn it back approximately 1 3/4 turns to center the gear.
4. Remove the two sector shaft cover attaching screws and the identification tag.
5. Tap the lower end of the sector shaft with a soft-faced hammer to loosen it, then lift the cover and shaft from the housing as an assembly. Discard the O-ring.
6. Remove the four valve housing

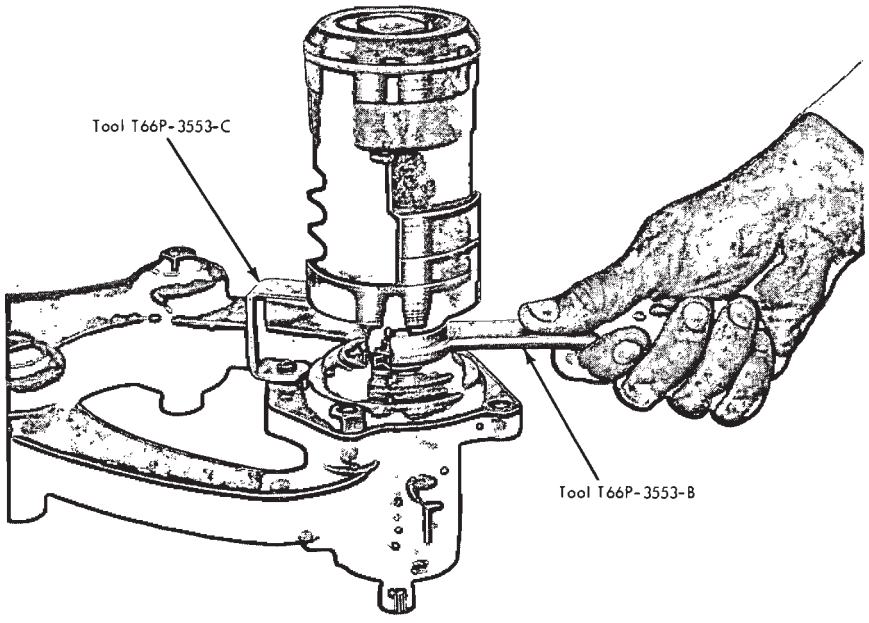

FIG. 3—Removing Worm Bearing Race Nut

attaching bolts. Lift the valve housing from the steering gear housing while holding the piston to prevent it from rotating off the worm shaft.

7. Remove the valve housing and lube passage O-rings and discard them.

8. Place the valve housing, worm and piston assembly in the bench mounted holding fixture Tool T57L-500-A with the piston on the top.

9. Rotate the piston upward (back off) 3 1/2 turns.

10. Insert Tool T66P-3553-C (with the arm facing away from the piston) into a bolt hole in the valve housing. Rotate the arm into position under the piston (Fig. 3).

11. Loosen the allen head race nut set screw from the valve housing.

12. Using Tool T66P-3553-B, loosen the worm bearing race nut.

13. Lift the piston-worm assembly from the valve housing. **During removal hold the piston to prevent it from spinning off of the shaft.**

14. Change the power steering valve centering shim.

15. Install the piston-worm assembly into the valve housing. **Hold the piston to prevent it from spinning off of the shaft.**

16. Install the worm bearing race nut and torque to specification using Tool T66P-3553-B (Fig. 4).

17. Install the race nut set screw (allen head) through the valve housing. Torque to specification.

18. Rotate the piston upward (back off) 1/2 turn and remove Tool T66P-3553-C.

19. Remove the valve housing, worm, and piston assembly from the holding fixture.

20. Position a new lube passage O-ring in the counterbore of the gear

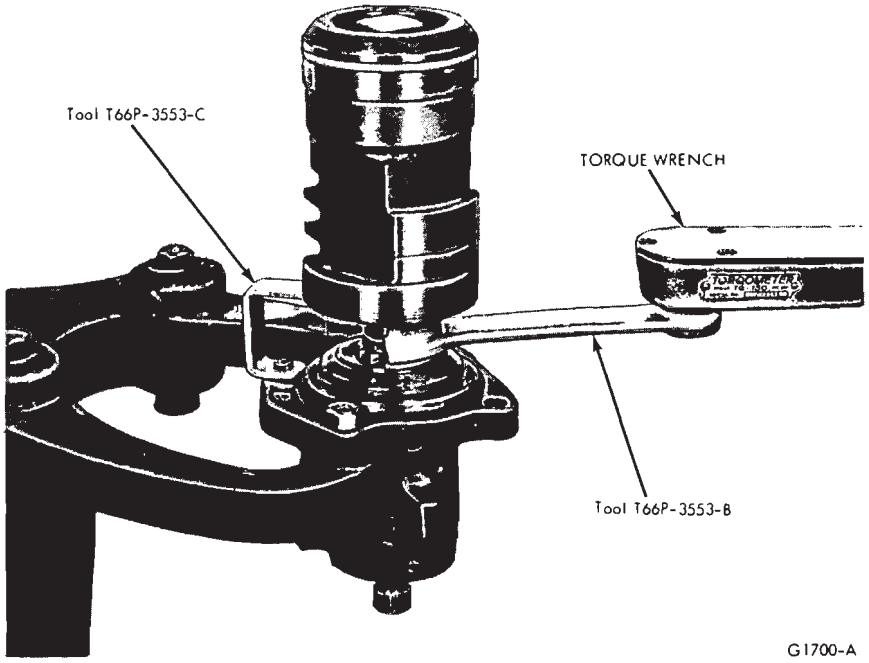

FIG. 4—Installing Worm Bearing Race Nut

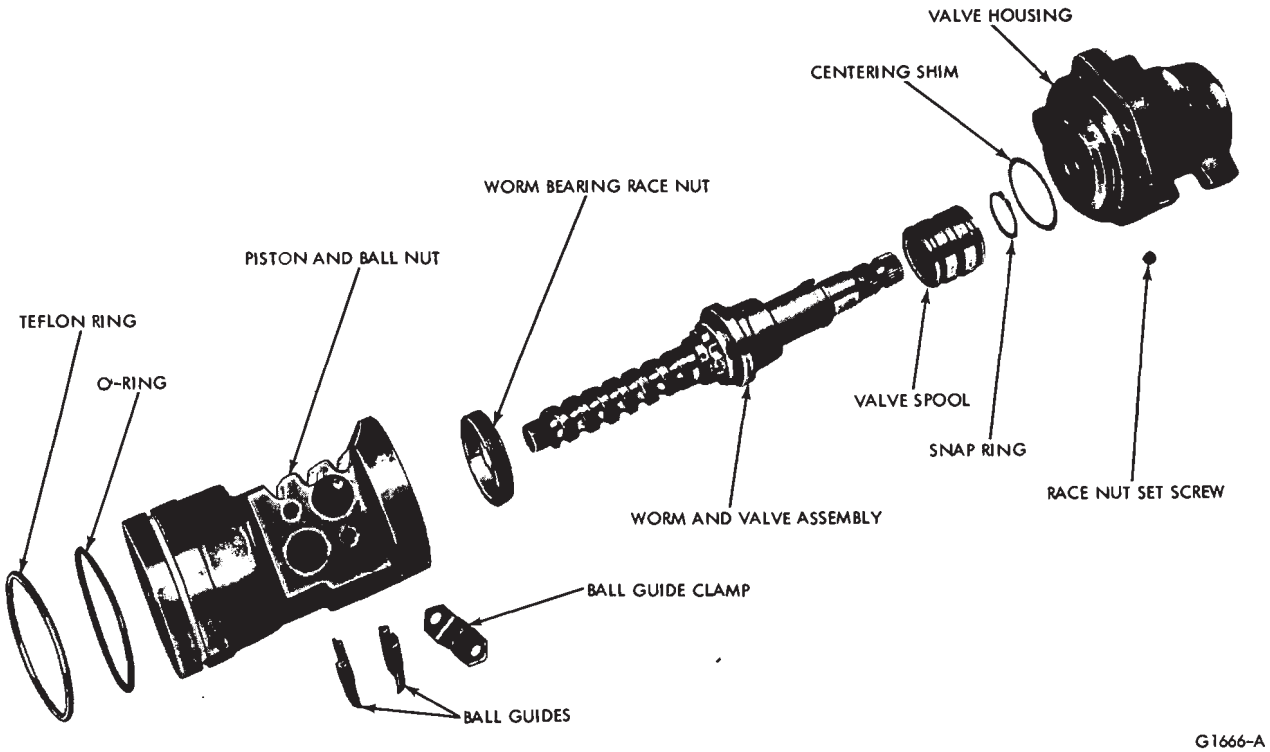

FIG. 5—Ball Nut and Valve Housing Disassembled

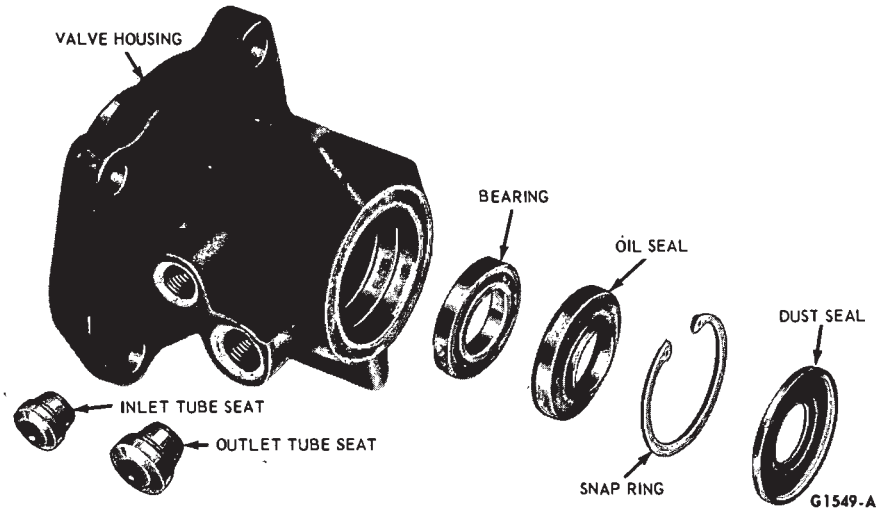

FIG. 6—Valve Housing Disassembled

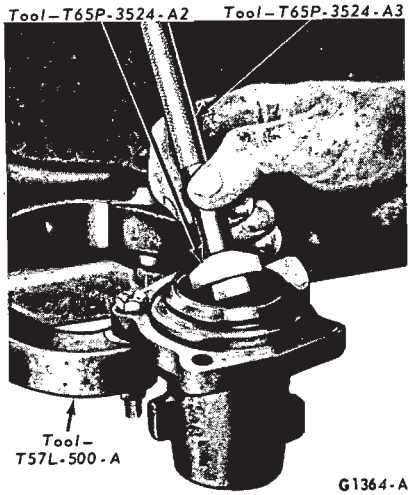

FIG. 7—Removing Bearing and Oil Seal

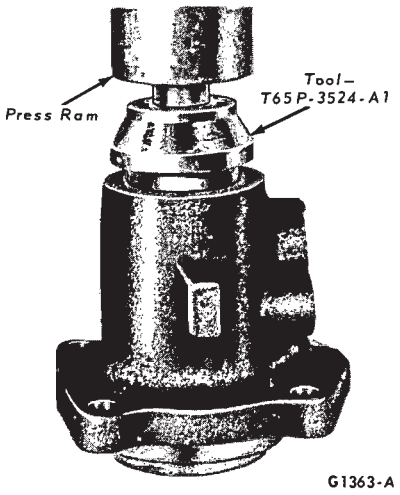

FIG. 8—Installing Valve Housing Bearing

housing.

21. Apply vaseline to the teflon seal on the piston.

22. Place a new O-ring on the valve housing.

23. Slide the piston and valve into the gear housing being careful not to damage the teflon seal.

24. Align the lube passage in the valve housing with the one in the gear housing, and install but do not tighten the attaching bolts.

25. Rotate the ball nut so that the teeth are in the same place as the sector teeth. Tighten the four valve housing attaching bolts to specification.

26. Position the sector shaft cover O-ring in the steering gear housing. Turn the input shaft as required to center the piston.

27. Apply vaseline to the sector shaft journal; then, position the sector shaft and cover assembly in the gear housing. Install the steering gear identification tag and the two sector shaft cover attaching bolts.

28. Position an in-lb torque wrench on the gear input shaft and adjust the meshload to approximately 4 in-lbs. Then, torque the sector shaft cover attaching bolts to specification.

29. After the cover attaching bolts have been tightened to specification, adjust the meshload to specification with an in-lb torque wrench.

STEERING GEAR DISASSEMBLY

1. Hold the steering gear over a drain pan in an inverted position and cycle the input shaft several times to drain the remaining fluid from the gear.

2. Mount the gear in a soft-jawed vise.

3. Remove the lock nut from the adjusting screw.

4. Turn the input shaft to either stop; then, turn it back approximately 1 3/4 turns to center the gear.

5. Remove the two sector shaft cover attaching screws and the identification tag.

6. Tap the lower end of the sector shaft with a soft-hammer to loosen it, then, lift the cover and shaft from the housing as an assembly. Discard the O-ring.

7. Turn the sector shaft cover counterclockwise off the adjuster screw.

8. Remove the four valve housing attaching bolts. Lift the valve housing from the steering gear housing while holding the piston to prevent it from rotating off the worm shaft. Remove the valve housing and the lube passage O-rings and discard them.

9. Stand the valve body and piston on end with the piston end down. Rotate the input shaft counterclockwise out of the piston allowing the ball bearings to drop into the piston.

10. Place a cloth over the open end of the piston and turn it upside down to remove the balls.

11. Remove the two screws that attach the ball guide clamp (Fig. 5) to the ball nut and remove the clamp and the guides.

12. Install the valve body assembly in the holding fixture (do not clamp in a vise) and loosen the race nut screw (allen head) from the valve housing and remove the worm bearing race nut as shown in Fig. 3.

13. Carefully slide the input shaft, worm and valve assembly out of the valve housing. Due to the close diametrical clearance between the spool and housing, the slightest cocking of the spool may cause it to jam in the housing.

14. Remove the shim from the valve housing bore.

PARTS REPAIR OR REPLACEMENT

Valve Housing

1. Remove the dust seal (Fig. 6) from the rear of the valve housing with Tools T59L-100-B and T58L-101-A and discard the seal.

2. Remove the snap ring from the valve housing.

3. Turn the fixture to place the valve housing in an inverted position.

4. Insert the special tool in the valve body assembly opposite the seal end and gently tap the bearing and seal out of the housing as shown in Fig. 7. Discard the seal. **Caution must**

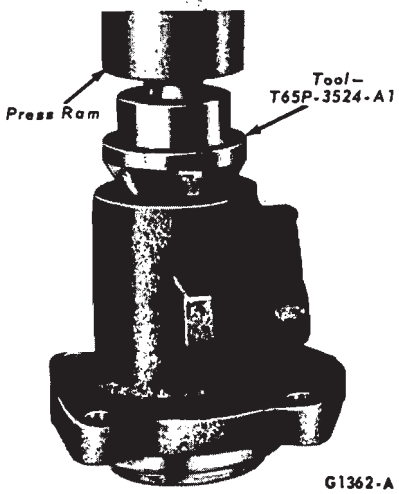

FIG. 9—Installing Oil Seal in Valve Housing

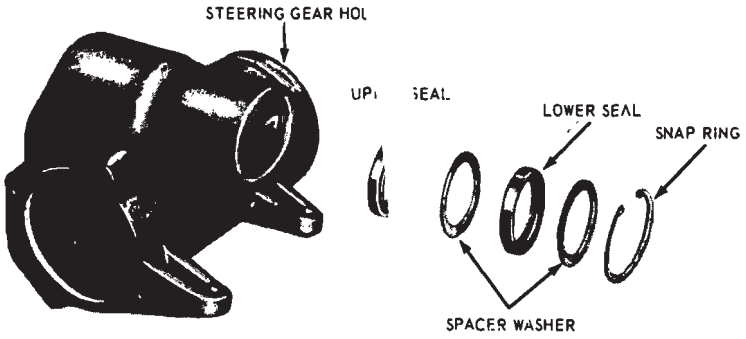

FIG. 10—Steering Gear Housing Disassembled

be exercised when inserting and removing the tool to prevent damage to the valve bore in the housing.

5. Remove the fluid inlet and outlet tube seats with an EZ-out if they are damaged.

6. Coat the fluid inlet and outlet tube seats with vaseline and position them in the housing. Install and tighten the tube nuts to press the seats to the proper location.

7. Coat the bearing and seal surface of the housing with a film of vaseline.

8. Position the bearing in the valve housing. Seat the bearing in the valve housing with the tool shown in Fig. 8. Make sure that the bearing is free to rotate.

9. **Dip the new oil seal in gear lubricant;** then, place it in the housing with the metal side of the seal facing outward. Drive the seal into the housing until the outer edge of seal does not quite clear the snap ring groove (Fig. 9).

10. Place the snap ring in the housing; then, drive on the ring with the tool shown in Fig. 9 until the snap ring seats in its groove to properly locate the seal.

11. Place the dust seal in the housing with the dished side (**rubber side**) **facing out.** Drive the dust seal into place with the tool shown in Fig. 9. The seal must be located behind the undercut in the input shaft when it is installed.

Worm and Valve

1. Remove the snap ring from the end of the actuator.

2. Slide the control valve spool (Fig. 5) off the actuator.

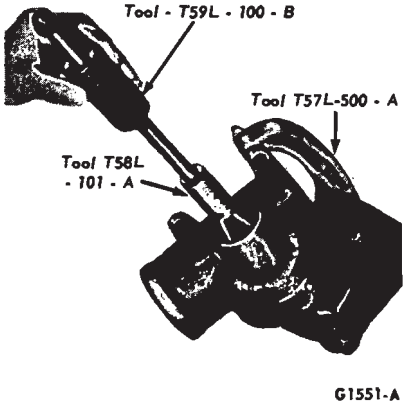

FIG. 11—Removing Lower Seal

3. Install the valve spool evenly and slowly with a slight oscillating motion into the flanged end of valve housing with the valve identification groove between the valve spool lands outward, checking for freedom of valve movement within the housing working area. The valve spool should enter the housing bore freely and fall by its own weight.

4. If the valve spool is not free, check for burrs at the outward edges of the working lands in the housing and remove with a hard stone.

5. Check the valve for burrs and if burrs are found, stone the valve in a **radial direction only.** Check for freedom of the valve again.

6. Remove the valve spool from the housing.

7. Slide the spool onto the actuator making sure that the groove in the spool annulus is toward the worm.

8. Install the snap ring to retain the spool.

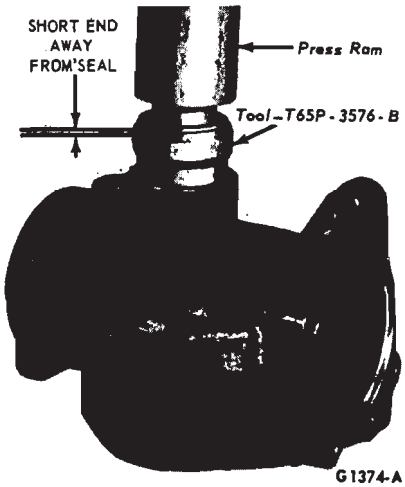

FIG. 12—Installing Sector Shaft Inner Seal

9. Check the clearance between the spool and the snap ring. The clearance should be between .0005-.035 inch. If the clearance is not within these limits, select a snap ring that will allow a clearance of .002 inch.

Piston and Ball Nut

1. Remove the teflon ring and the O-ring (Fig. 5) from the piston and ball nut.

2. Dip a new O-ring in gear lubricant and install it on the piston and ball nut.

3. Install a new teflon ring on the piston and ball nut being careful not to stretch it any more than necessary.

Steering Gear Housing

1. Remove the snap ring and the spacer washer (Fig. 10) from the lower end of the steering gear hous-

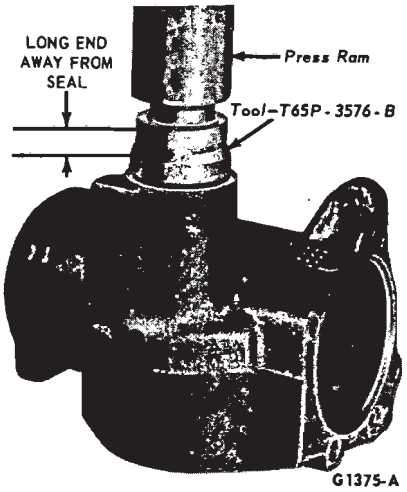

FIG. 13—Installing Sector Shaft Outer Seal

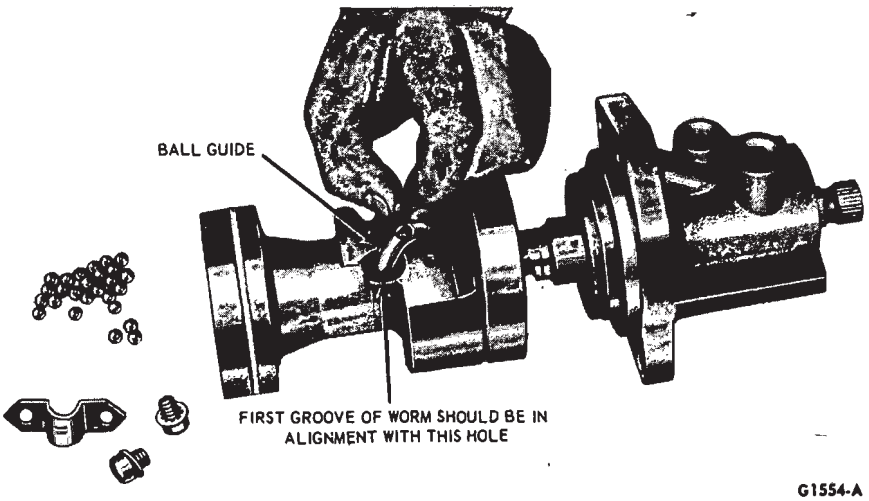

FIG. 14—Assembling Piston on Worm Shaft

ing.

2. Remove the lower seal from the housing as shown in Fig. 11. Lift the spacer washer from the housing.

3. Remove the upper seal in the same manner as the lower seal.

4. **Dip both sector shaft seals in gear lubricant.**

5. Apply Lubricant to the sector shaft seal bore of the housing and position the sector shaft inner seal into the housing with the lip facing inward. Press the seal into place with the tool shown in Fig. 12. Place a spacer washer (0.090 inch) on top of the seal and apply more Lubricant to the housing bore.

6. Place the outer seal in the housing with the lip facing inward and press it into place as shown in Fig. 13. Then, place a 0.090 inch spacer washer on top of the seal.

7. Position the snap ring in the housing. Press the snap ring into the housing with the tool shown in Fig. 13 to properly locate the seals and engage the snap ring in the groove.

STEERING GEAR ASSEMBLY

Do not clean, wash, or soak seals in cleaning solvent.

1. Mount the valve housing in the holding fixture with the flanged end up.

2. Place the required thickness valve spool centering shim (Fig. 5) in the housing. **Use one shim only.**

3. Carefully install the worm and valve in the housing.

4. Install the race nut in the housing and torque it to specification.

5. Install the race nut set screw (allen head) through the valve housing and torque it to specification.

6. Place the piston on the bench with the ball guide holes facing up. Insert the worm shaft into the piston so that the first groove is in alignment with the hole nearest to the center of the piston (Fig. 14).

7. Place the ball guide in the piston. Place the 27 to 29 balls in the ball guide (Fig. 14) turning the worm in a clockwise direction as viewed from the input end of the shaft. If all of the balls have not been fed into the guide upon reaching the right stop, rotate the input shaft in one direction and then in the other while installing the balls. After the balls have been installed, do not rotate the input shaft or the piston more than 3 1/2 turns off the right stop to prevent the balls from falling out of the circuit.

8. Secure the guides in the ball nut with the clamp (Fig. 5).

9. Position a new lube passage O-ring in the counterbore of the gear housing.

10. Apply vaseline to the teflon seal on the piston.

11. Place a new O-ring on the valve housing.

12. Slide the piston and valve into the gear housing being careful not to damage the teflon seal.

13. Align the tube passage in the valve housing with the one in the gear housing, and install but do not tighten the attaching bolts.

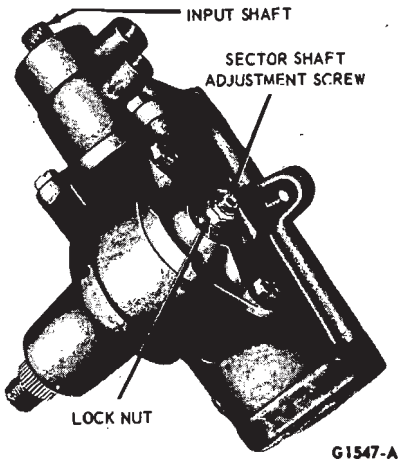

FIG. 15—Adjusting Mesh

14. Rotate the ball nut so that the teeth are in the same plane as the sector teeth. Tighten the four valve housing attaching bolts to specifications.

15. Position the sector shaft cover O-ring in the steering gear housing. turn the input shaft as required to center the piston.

16. Apply vaseline to the sector shaft journal then position the sector shaft and cover assembly in the gear housing. Install the steering identification tag and two sector shaft cover attaching bolts. Torque the bolts to specifications.

17. Attach an in-lb torque wrench to the input shaft. Adjust the mesh load to specifications as shown in Fig. 15.

5 SPECIFICATIONS

INTEGRAL POWER STEERING GEAR SPECIFICATIONS

Description	Ford Design (XR–50)
Type	Recirc. Ball Torsion Bar
Ratio	17:1
Turns of Steering Wheel (Lock to Lock-Linkage Disconnected)	4
Fluid Specifications	C1AZ-19582-A
Fluid Capacity (Included in Pump Reservoir Fill)	1.6 Pints (Approx.)
Phosphorescent Dye Additive (For Leak Detection)	M99B103-A (4 oz. per qt.)
Sector Shaft End Play – Linkage Disconnected	None
Sector Shaft Mesh Load. Total Over Mechanical Center Position. Must be ① Greater Than Worm Bearing Preload Torque, Shown Below	17 In-Lb. (Max.)
Worm Bearing Preload	2-8 In-Lb.
Clearance Between Valve Spool & Retaining Ring	.0035–.0005" Preferable .002"
Pressure Variation Between Right & Left Turn (At 250 P.S.I.)– Check Efforts Each Side of Center	4 In.-Lb. Max. Variation
Clearance Between Inner Sector Seal and Housing	.025"

①9-13 In-Lb.

②3 In Lb in Excess of Valve Assy. Drag Total Worm Bearing Preload and Seal Drag not to Exceed 8 In Lb.

CG1725-A

SPECIAL SERVICE TOOLS

Tool No.	Description
T56L-33610-D	Pressure Testing Gauge Assembly
T64P-3590-F	Steering Pitman Arm Remover
T57L-500-A	Bench Mounted Holding Fixture
T66P-3553-C	Spacer
T66P-3553-B	Spanner Wrench
T59L-100-B	Slide Hammer-Short
T58L-101-A	Puller Attachment
T65P-3524-A1, A2, A3	Bearing Remover and Installer

CG1726-A

PART 13-07 Ford-Thompson Power Steering Pump

A page number indicates that the item is for the vehicle(s) listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle(s) listed.

1 DESCRIPTION

The Ford-Thompson power steering pump is a belt driven slipper type pump which is integral with the reservoir (Fig. 1). It is constructed so that the reservoir is attached to the rear side of the pump housing front plate and the pump body is encased within the reservoir (Fig. 2).

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

PUMP BELT TENSION ADJUSTMENT

Pump drive belt tension cannot be checked accurately using the thumb pressure or belt deflection methods. Correct belt adjustment is assured only with the use of a belt tension gauge.

1. Check the belt tension with a belt tension gauge tool T63L-8620-A. With a new belt, or one that has been run for less than 15 minutes, the tension should be within 120-150 lbs. With a belt that has been run for more than 15 minutes, the tension should be within 90-120 lbs.
2. To adjust the belt on 6 cyl. engines, loosen the mounting bolts incorporated on the front face of the pump cover plate (hub side) and one nut at the rear of the reservoir (on 8 cyl. engines, loosen the mounting belt in the adjusting slot and the nut directly above the adjusting slot). On all vehicles equipped with power steering except those with 429, 460 CID engines or cast aluminum pump brackets, fit Tool T70P3D643-A over the boss on the pump housing. Now use a 1/2 inch drive ratchet which will fit into the 8-point hole in the special tool. Pry upward to correct the belt tension.

Do not pry against the reservoir to obtain proper belt load as it can be deformed and cause a leak.

3. Recheck the belt tension. When the tension has been correctly adjusted, tighten the bolts and the nut to specification.

POWER STEERING PUMP DRIVE BELT REPLACEMENT

1. Loosen the idler pulley attaching bolts and remove the compressor drive belt if equipped with an air conditioner.
2. Loosen 3 bolts and one nut attaching the power steering pump to the pump bracket, and remove the pump drive belt.
3. **Position the power steering pump drive belt on the pulleys.**
4. Adjust the drive belt tension as outlined in this section to specification and tighten the pump attaching bolts and one nut to specification.
5. Install the compressor drive belt if equipped with an air conditioner and adjust to specification (Group 34).

POWER STEERING PUMP BELT INSTALLATION AND/OR ADJUSTMENT—VEHICLES WITH 429 OR 460 CID ENGINES

A horizontal stud in the adjustable bracket protrudes through a hole in a stationary bracket which mounts the

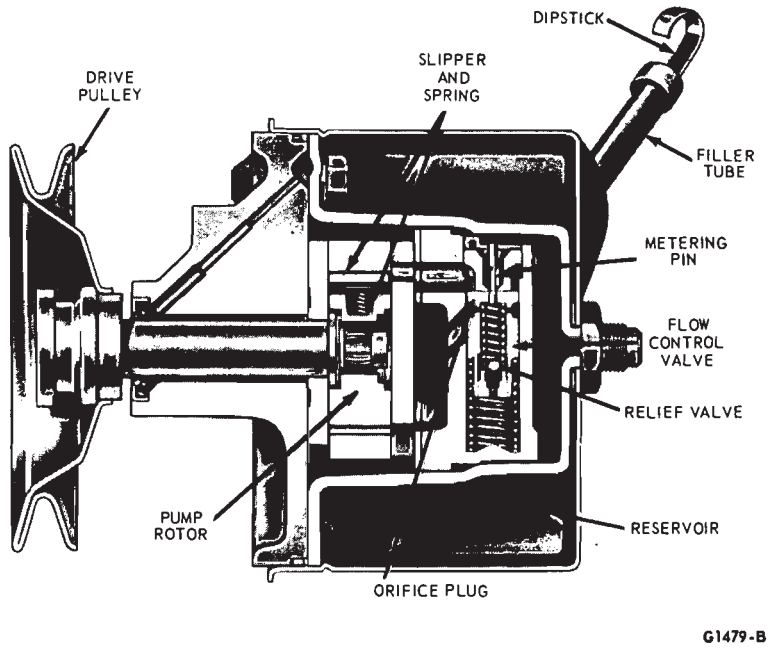

FIG. 1—Power Steering Pump—Sectional View

pump (Fig. 3).

To remove or replace a power steering pump belt:

1. Loosen the three nuts on the verticle studs in the slotted holes so the adjustable bracket is free to slide inboard on the stationary bracket.
2. Loosen the nut on the horizontal stud sufficiently to move the pump assembly and adjustable bracket inboard. Remove the belt.
3. If installing a new belt, position it on the proper pulleys.
4. Tighten the nut on the horizontal adjustment stud until snug.
5. Install a belt tension gauge on the belt and tighten the horizontal adjustment stud until the proper tension is attained (120-150 lbs. for a new belt, 90-120 for a used belt).
6. Torque the nuts on the verticle studs in the slotted holes to 30-40 ft-lb.
7. Remove the tension gauge.

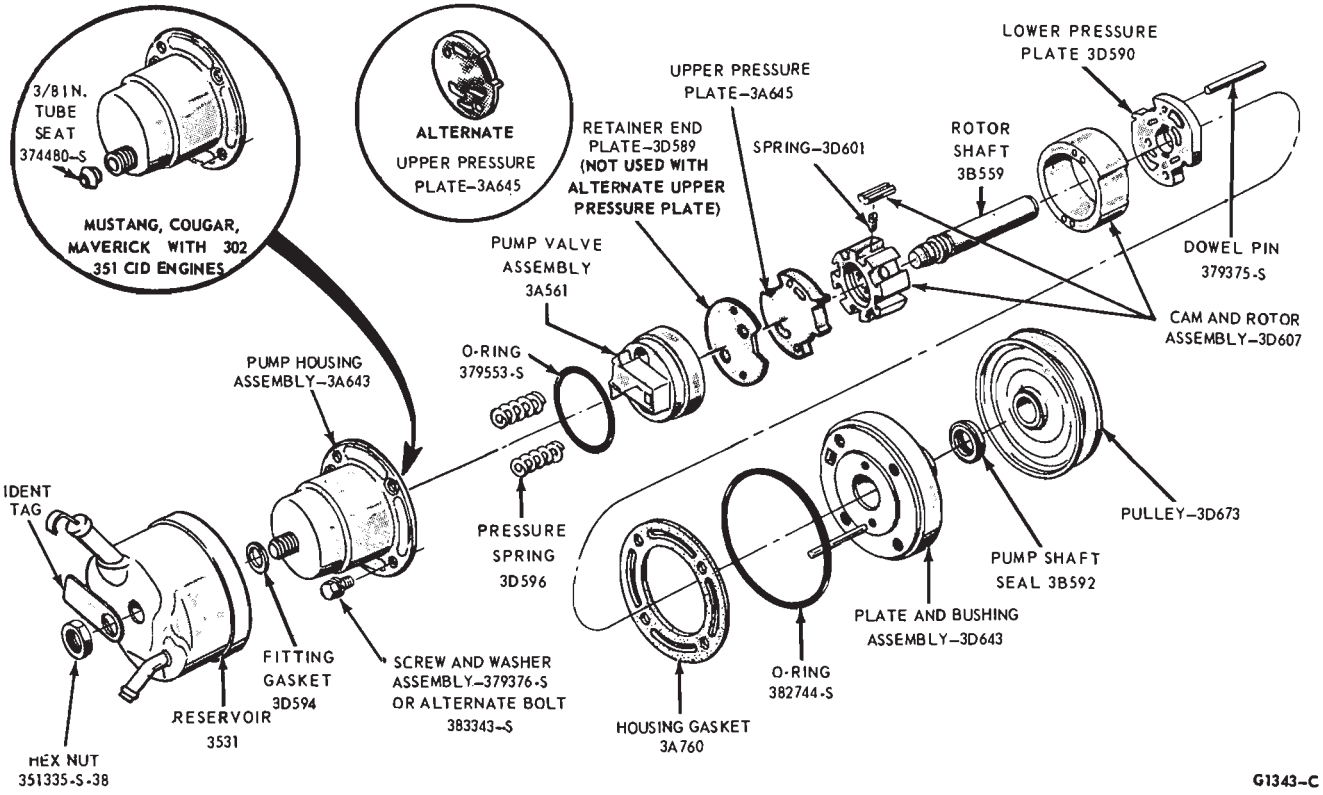

FIG. 2—Power Steering Pump Disassembled

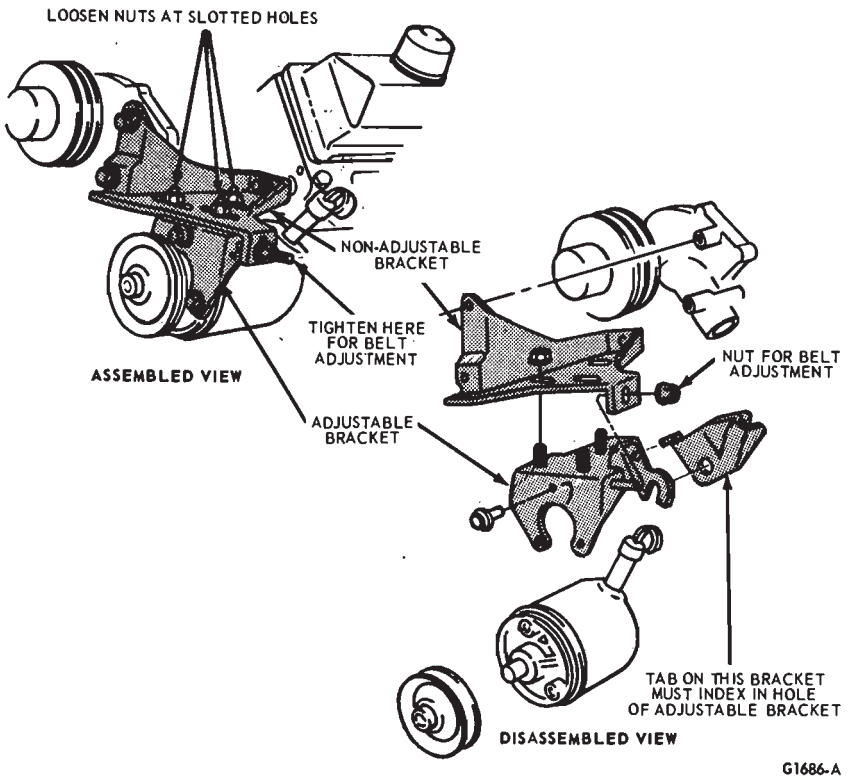

FIG. 3—Power Steering Pump Installation—429 or 460 CID Engines

3 REMOVAL AND INSTALLATION

POWER STEERING PUMP

EIGHT CYLINDER WITHOUT AIR CONDITIONER AND ALL SIX CYLINDER

1. Remove the power steering fluid from the pump reservoir by disconnecting the fluid return hose at the reservoir, and allow the fluid to drain into a suitable container.
2. Disconnect the pressure hose from the pump.
3. Remove 3 bolts from the front of the pump and the one nut at the rear (rear nut on 8 cyl. engines only) that attach the pump to the mounting bracket; disconnect the belt from the pulley and remove the pump from the vehicle.
4. Position the pump to the mounting bracket and install the 3 bolts at the front of the pump and (rear nut on 8 cyl. engines only) the 1 nut at the rear. Torque to specification.
5. Place the belt on the pulley and adjust the belt tension (Section 2) with Tool T63L-8620-A and tighten the bolts and nut to specifications.
6. Torque the pressure hose fitting hex nut to specification. Then, connect the pressure hose to the fitting and torque the hose nut to specification.
7. Connect the hose to the pump. Then, tighten the clamp.
8. Fill the power steering pump reservoir with transmission fluid C1AZ-19582-A and cycle the system to remove air from the steering gear system.
9. Check for leaks and again check the fluid level. Add fluid as necessary.

EIGHT CYLINDER WITH AIR CONDITIONER

1. Remove the power steering fluid from the pump reservoir by disconnecting the fluid return hose from the reservoir and allow the fluid to drain in a suitable container.
2. Disconnect the pressure hose from the pump.
3. Remove 3 bolts from the front of the pump and the one nut at the rear that attach the pump to the mounting bracket and remove the drive belt from the pump pulley.
4. Loosen the upper pump bracket-to-engine attaching bolt and remove the bolt in the belt adjusting slot. Remove the pump.
5. Position the pump to the bracket and install the bracket-to-pump attaching bolts and nuts. Tighten to specifications.
6. Place the belt on the pump pulley. Adjust the belt tension as outlined in Section 2 and tighten the bolts and nut to specification.
7. Torque the pressure hose fitting hex nut to specification. Then, connect the pressure hose to the fitting and torque the hose nut to specification.
8. Connect the return hose to the

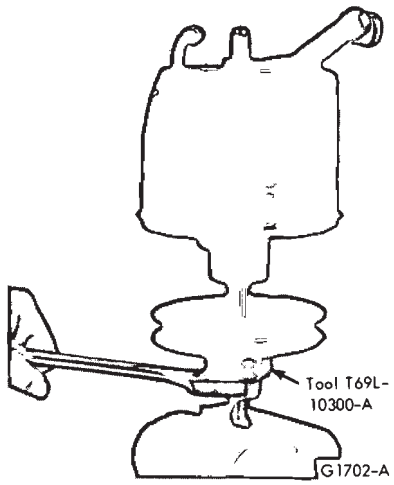

FIG. 4—Removing Power Steering Pump Pulley

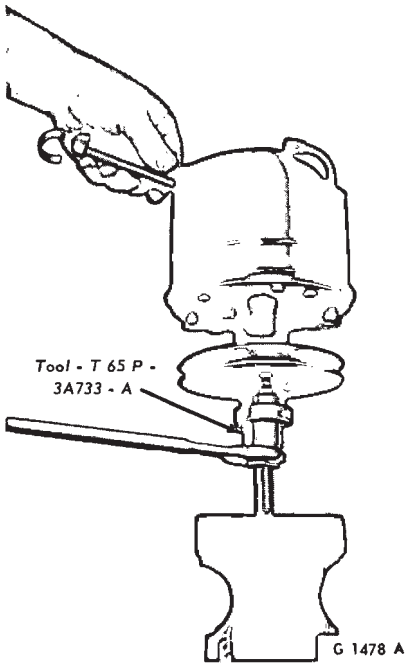

FIG. 5—Installing Power Steering Pump Pulley

power steering pump and tighten the clamp.

9. Fill the pump with automatic transmission fluid C1AZ-19582-A. Bleed the air from the system (Part 13-01) and check for leaks and again check the fluid level. Add fluid as required.

POWER STEERING PUMP PULLEY

REMOVAL

1. Drain as much of the fluid as possible from the pump through the filler pipe.

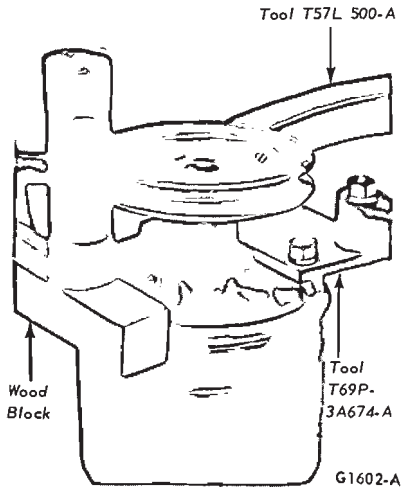

FIG. 6—Removing Pump Reservoir

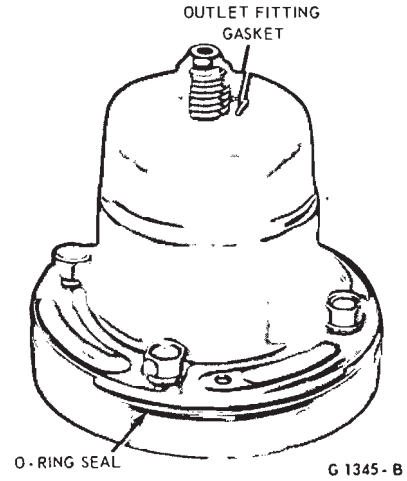

FIG. 7—Gasket Locations

2. Install a 3/8-16 inch capscrew in the end of the pump shaft to prevent damage to the shaft end by the tool screw.

3. Install the pulley remover, Tool T69L-10300-A, on pulley hub, and place the tool and pump in a vise as shown in Fig. 4.

4. Hold the pump and rotate the tool nut counterclockwise to remove the pulley (Fig. 4). **The pulley must be removed without in and out pressure on the pump shaft to prevent damage to internal thrust areas.**

INSTALLATION

1. Position the pulley to the pump shaft and install Tool T65P-3A733-A as shown in Fig. 5.

2. Hold the pump and rotate the tool nut clockwise to install the pulley on the shaft. The pulley face will be flush with end of pump shaft. **Install the pulley without in and out pressure on the shaft to prevent damage to internal thrust areas.**

3. Remove the tool.

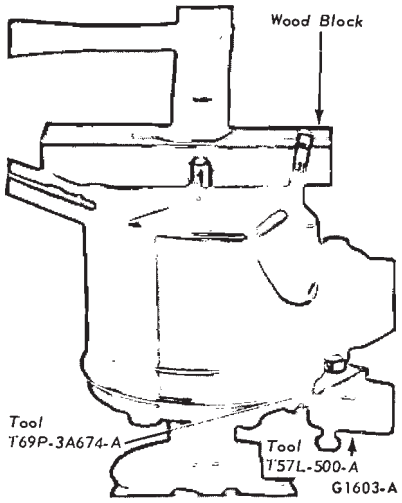

FIG. 8—Installing Reservoir on Pump—Typical

POWER STEERING PUMP RESERVOIR

Reservoir replacement must be done on a clean workbench. Cleanliness of work area and tools is extremely important when repairing any hydraulic unit. Thoroughly clean the exterior of the pump with a suitable cleaning solvent. **Do not clean, wash or soak the shaft oil seal in solvent.** Plug the inlet and outlet openings with plugs or masking tape before cleaning the pump exterior or removing the reservoir.

REMOVAL

1. Assemble the adapter plate (Tool T69P-3A674-A) to the bench mounted fixture tool (T57L-500-A). Position the pump and pulley on the adapter plate, pulley facing down.

2. Remove the outlet fitting hex nut and the service identification tag.

3. Invert the pump so the pulley is facing up and remove the reservoir by tapping around the flange with a wood block (Fig. 6).

4. Remove the reservoir O-ring seal and the outlet fitting gasket from the pump.

INSTALLATION

1. Install a new gasket on the outlet fitting and a new reservoir O-ring seal on the pump housing plate (Fig. 7). **The old gasket and seal should never be re-used.**

2. Apply vaseline to the reservoir O-ring seal and to the inside edge of the new reservoir flange. **Do not twist the O-ring seal.**

3. Position the reservoir over the pump and align the notch in the reservoir flange with the notch in the outer diameter of the plate and bushing assembly.

4. Install the reservoir on the pump and O-ring seal with a plastic or rubber hammer and a block of wood as shown in Fig. 8. **Tap at the rear of the reservoir and on the outer edges only.**

5. Inspect the assembly to be sure the reservoir is evenly seated on the pump housing plate.

6. Position the service identification tag on the outlet fitting and install the outlet fitting hex nut. Torque the nut to specification. **Do not exceed specification.**

4 MAJOR REPAIR OPERATIONS

DISASSEMBLY

Disassembly of the pump and its subassemblies must be made on a clean work bench. In repairing any hydraulically operated unit, cleanliness is of utmost importance. Clean the exterior of the unit with a suitable solvent and drain as much of the fluid as possible.

If only the reservoir is to be removed, plug the inlet and outlet openings with masking tape or plugs. Do not immerse the shaft oil seal in solvent. If only the rotor shaft seal is to be replaced, see Rotor Shaft Seal Replacement outlined in this section.

1. Assemble the adapter plate (Tool T69P-3A674-A) to the bench mounted holding fixture Tool T57L-500-A (Fig. 9).

2. Position the pump assembly, with pulley assembled, on the adapter plate, pulley facing down.

3. Remove the outlet fitting nut and the service identification tag.

4. Invert the pump assembly and, using a block of wood and a rubber or plastic hammer, remove the pump reservoir and seal by tapping around the flange of the reservoir and on the underside of the filler neck.

5. Again invert the pump assembly, loosen and remove the pump housing retention bolts and remove the pump housing.

6. If necessary, remove the following components from the pump housing; the housing cover, the O-ring seal and the pressure springs These components normally will remain in the pump housing when it is removed.

7. Remove and discard the pump cover gasket.

8. Remove the retainer end plate and upper pressure plate (in some pumps, the end plate and upper pressure plate are integral).

9. Remove the loose fitting dowel pin. Be careful not to bend the fixed dowel pin which remains in the housing plate assembly.

10. Remove the rotor assembly being careful to prevent the springs and slippers from falling out and becoming lost. Do not disassemble further unless the lower pressure plate, housing plate, rotor shaft and/or seal is to be replaced.

11. Invert the pump assembly and, using Tool T69L-10300-A, remove the pulley.

12. Clean any rust, road dirt, burrs, scoring, etc. from the pulley end of the rotor shaft prior to removal of the shaft from the housing plate. The shaft must come out without restrictions to prevent scoring or damage to the bushing. Remove the pump rotor shaft.

13. Remove the lower pressure plate.

PARTS REPAIR OR REPLACEMENT

ROTOR SHAFT SEAL REPLACEMENT

Removal

1. Remove the pulley from the rotor shaft as described under Power Steering Pump Pulley Removal.

2. Position the pump assembly in the bench mounted holding fixture, T57L-500-A or on the assembled adapter plate, T69P-3A674-A, pulley end of the shaft up.

3. Clean any rust or road dirt from the pulley end of the rotor shaft.

4. To prevent scoring of the shaft, wrap .005 shim stock (free of burrs) around the rotor shaft and push it into the ID of the seal until it is against the bushing.

5. Using a sharp tool such as a sheet metal punch, carefully pierce the metal seal body face and pry the old seal out (Fig. 10). **Do not damage the bushing, the housing or the rotor shaft.**

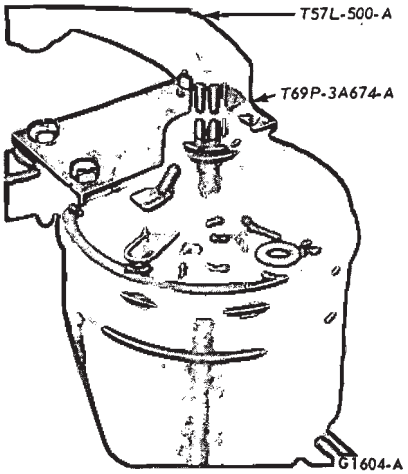

FIG. 9—Adapter Plate Installation

Installation

1. Remove the shim stock.

2. Position the new rotor shaft seal on the shaft seal protector, Tool T68P-3B592-B.

3. Insert the seal protector tool and the rotor shaft seal onto the shaft (Fig. 11).

4. Using the seal installation Tool T68P-3B592-A and a rubber or plastic hammer, tap gently on the end of the tool until the seal is completely installed (flush with the end of the seal bore).

5. Remove the tools.

6. Install the pulley on the rotor shaft as described under Power Steering Pump Pulley Installation.

ASSEMBLY

1. Assemble adapter plate (Tool T69P-3A674-A) to the bench mounted holding fixture Tool T57L-500-A. Position the pump assembly on the adapter plate, pulley side facing down. (If the lower pressure plate and

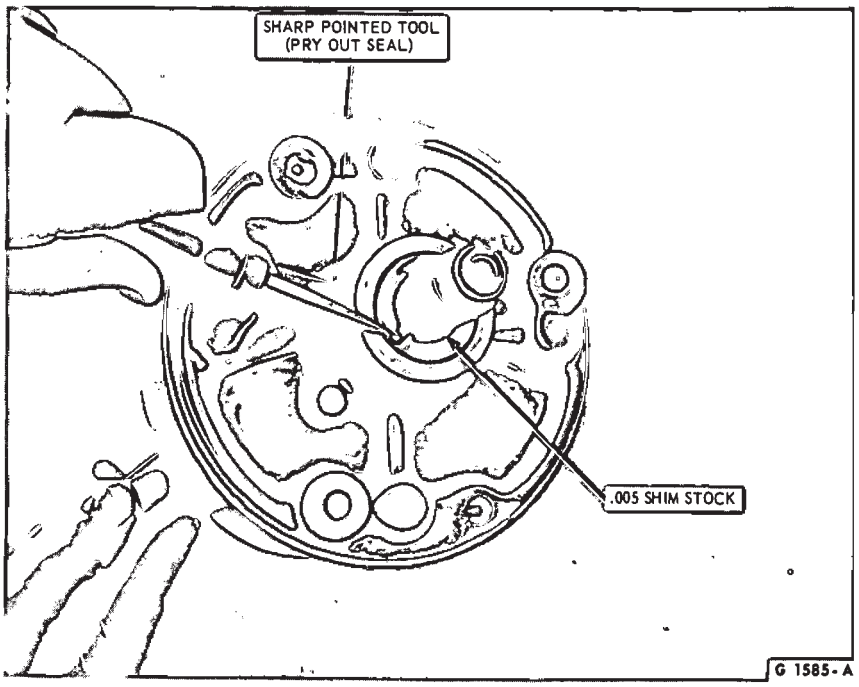

FIG. 10—Rotor Shaft Seal Removal

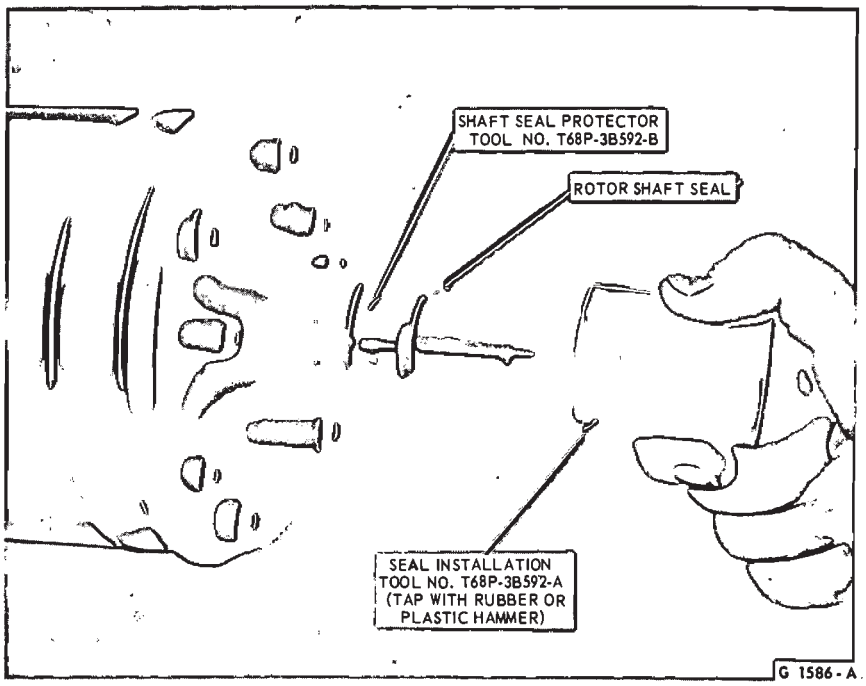

FIG. 11—Rotor Shaft Seal Installation

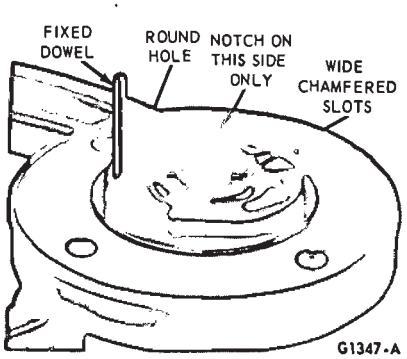

FIG. 12—Lower Pressure Plate Installed

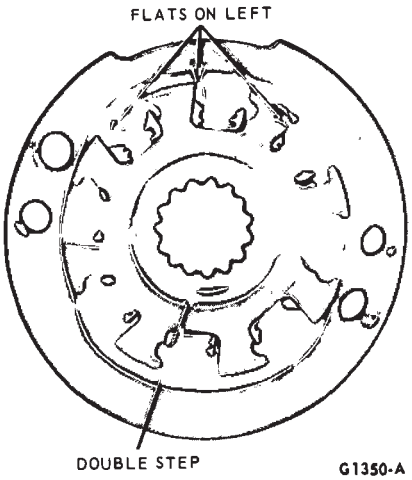

FIG. 13—Correct Slipper Installation

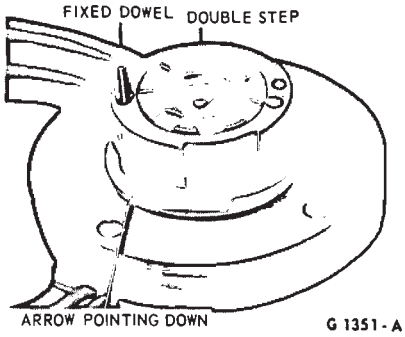

FIG. 14—Cam and Rotor Installation

rotor shaft have not been disassembled, omit Steps 2 and 3).

2. Insert the lower pressure plate on the anchor pin with the wide chamfered slots at the center hole facing up (Fig. 12).

3. Dip the rotor shaft in specified steering gear lubricant (C1AZ-19582A); then, insert the rotor shaft into the lower pressure plate and housing plate.

4. If the rotor assembly is disassembled, hold the cam insert with the notch on the OD of the cam at the top and the arrow on the OD of the cam pointing downward.

5. Insert the rotor in the cam with the double step in the ID of the rotor facing upward.

6. With the rotor extended upward approximately one half way out of the cam, insert a spring into a rotor spring pocket working in the rotor cavity directly beneath the cam notch.

7. Use one of the slippers to compress the spring and install the slipper with the groove in the slipper facing upward (toward the cam notch). The flats on the side of the slipper should be on the left (Fig. 13).

8. Hold the cam stationary and turn the rotor either to the right or left, one space at a time. Repeat Step

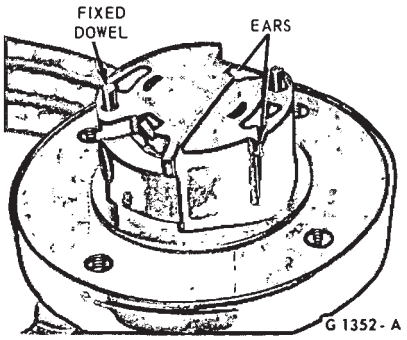

FIG. 15—Upper Pressure Plate Installation

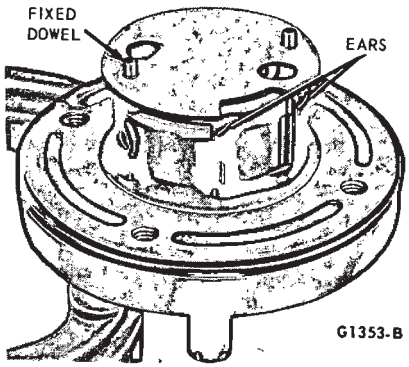

FIG. 16—Retainer End Plate Installation

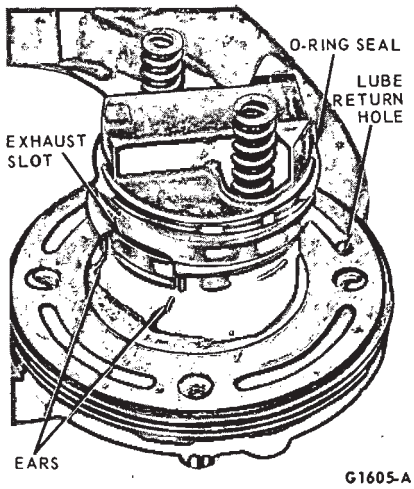

FIG. 17—Valve and Pressure Spring Installation

7 until all the rotor cavities have been filled. Be careful when turning the rotor that the springs and slippers already inserted do not fall out.

9. Install the cam and rotor assembly onto the pump housing plate with the fixed dowel passing through the first hole to the left of the cam notch when the arrow on the cam OD is pointing toward the lower pressure plate (Fig. 14). If the cam and rotor

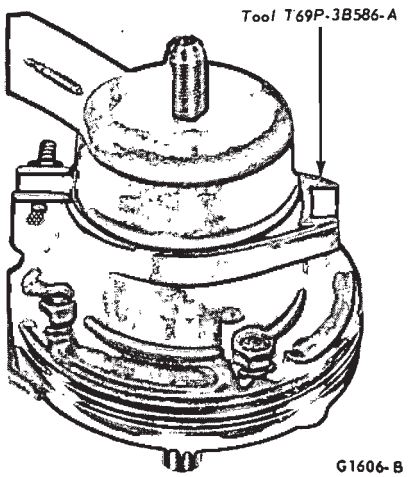

FIG. 18—Pump Housing Installation

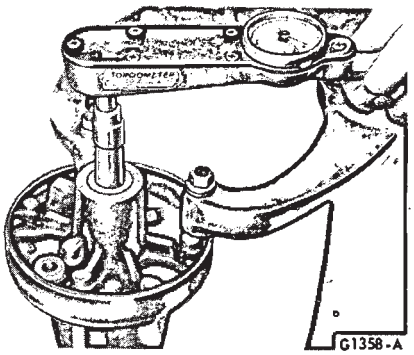

FIG. 19—Checking Pump Rotational Torque

assembly will not seat, turn the rotor shaft slightly until the spline teeth mesh, allowing the cam and rotor to drop down into position.

10. Insert the loose fitting dowel through the cam insert and lower plate into the hole in the housing plate assembly. When the loose dowel is properly installed the heights of the two dowels must be equal. Squirt the rotor, springs, slippers and cam insert with C1AZ-19582-A lubricant.

11. Place the upper pressure plate with the face having the tapered notch down against the cam insert. The fixed dowel should pass through the round dowel hole and the loose dowel through the elongated hole. The slot between the ears on the pressure plate OD should match the notch on the cam insert OD (Fig 15).

12. Install the retainer end plate so the slot on the end plate OD matches the corresponding notches of the upper pressure plate and cam (Fig. 16).

13. Install the pump valve assembly O-ring seal onto the pump valve assembly being careful not to twist the seal (Fig. 17).

14. Place the pump valve assembly on top of the retainer end plate with the large exhaust slot on the pump valve in line with the OD notches of the previously assembled parts. The stack of parts must be fully seated. If the pump valve has been installed correctly, the relief valve stem will be in line with the lube return hole in the pump housing plate (Fig. 17).

15. Place small amounts of vaseline on the pump housing plate to hold the cover gasket in place. Install the gasket on the pump housing plate.

16. Insert the pressure plate springs into the pockets in the pump valve assembly. Vaseline may be placed in the spring pockets to hold the springs in position (Fig. 18).

17. Using Tool T69P-3B586-A, plug the intake hole in the housing (Fig. 18).

18. Lubricate the inside of the housing and the housing cover seal with C1AZ-19582-A lubricant. Fabricate two studs (3/8-16 x 1.55) to be used as positioning guides. Install one in the housing plate bolt hole closest to the drain hole and one in the bolt hole diametrically opposite.

19. Align the small diameter lube hole in the housing rim with the lube hole in the housing plate.

20. Install the housing, applying an even, downward pressure. The pressure plate springs **must not** be jarred and moved out of position. Remove the guide studs.

21. Install the housing retaining bolts finger tight.

22. Remove Tool T69P-3B586-A.

23. Torque the retaining bolts **evenly** to 28-32 ft-lbs until the housing flange contacts the gasket.

24. Install a 3/8 x 16 hex head screw, finger tight, into the end of the rotor shaft. Using a torque wrench, check the input torque of the shaft (Fig. 19). The torque should not exceed 15 in-lbs. If it does, loosen the retaining bolts slightly, rotate the rotor shaft, retorque the bolts evenly and again check the shaft torque. **The pump must not be used if the shaft torque exceeds 15 in-lbs.**

25. Release the pin in the bench holding fixture and agitate the pump assembly back and forth. If there is a rattle, the pressure plate springs have fallen out of their seats and must be reinstalled.

26. Install the reservoir O-ring on the housing plate being careful not to twist the O-ring. Apply vaseline to the seal and to the ID of the reservoir

flange.

27. Install the reservoir, aligning the notch in the reservoir flange with the notch in the OD of the pump housing plate and bushing assembly. Using only a plastic or rubber hammer, tap at the **rear on the outer corners** of the reservoir to avoid damage.

28. Inspect the assembly to determine if the reservoir is seated on the housing plate.

29. Install the service identification tag on the outlet valve fitting.

30. Install the outlet valve fitting nut and torque to 43-47 ft-lbs.

31. Invert the pump assembly.

32. If the pulley was removed, install the correct pulley using Tool T65P-3A733-A.

5 SPECIFICATIONS

FORD–THOMPSON POWER STEERING PUMP ATTACHING TORQUE LIMITS (FT–LBS)

Vehicle Application	Ford Mercury Meteor						Falcon Maverick			T'Bird Mark III Lincoln		Mustang Cougar						Fairlane Montego			
Engine Application (CID)	240	302	351	390	428	429	170	200	302	429	460	200	250	302	351	390	428	250	302	351	429
OPERATION																					
Pump to Front Bracket	30-40	30-45					30-40			30-45		30-40		30-45				30-40	30-45		
Pump Pivot	30-40	25-40		30-40			30-40		25-40	30-40		30-40		25-40		30-40		30-40	25-40		30-40
Pump Brkt. to Engine (Front)	15-20	30-45					7-10		30-40	30-45		7-10	–	30-45				–	30-45		
Pump Brkt. to Engine (Side)	45-65	–					19-25		–	–		19-25	30-45	–				30-45	–		
Pump to Rear Brkt. Nut	–	20-30					20-30			20-30		20-30	–	20-30				–	20-30		
Pressure Hose to Pump Nut	20-30						20-30		15-25	20-30		20-30		16-25		20-30		20-30			
Belt Adjustment	30-40	25-40		30-40		–	30-40		25-40	–		30-40		25-40		30-40		30-40	25-40		–

CG1698-A

FORD–THOMPSON POWER STEERING PUMP SERVICE SPECIFICATIONS

Description	Ford–Thompson
Pump Rotor Shaft End Play	.017 In. Max. – .003 In. Min.
Max. Torque Allowed to Rotate Rotor Shaft	15 In.-Lb.
Stamped Housing to Plate Assy. Screw and Washer Assy.	Screw and Washer Assy. 28–32 Ft.-Lb. Bolt Hex Washer Hd. 38–47 Ft.-Lb.
Reservoir to Stamped Housing Nut	43–47 Ft.-Lb.

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